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SOWERBY'S MODELS

OF

BRITISH FUNGI.

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GUIDE

TO

SOWERBY'S MODELS

OF

BRITISH FUNGI

IN THE

DEPARTMENT OF BOTANY,

BRITISH MUSEUM (NATURAL HISTORY).

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PREFACE.

THE collection of models described in this Guide was made by James Sowerby in the course of the publication of his *English Fungi* (1797—1809). His purpose in their preparation was to exhibit to the public such a series of edible and poisonous species as would help to prevent the fatal mistakes so often made from eating poisonous fungi. His collection, consisting of more than two hundred models, was arranged in his house, and opened free to the public on two days each month.

After his death the models were acquired, in 1844, by the Museum from his son, James De Carle Sowerby.

The greater number were made of fragile unbaked pipe-clay. Many of the models were injured before they came into the possession of the Museum, and in the course of years the colouring had been greatly altered by light and dust. The injuries having been carefully repaired by a skilful formatore, Mr. Worthington G. Smith undertook to restore the natural colours and to remount the models. By his deft manipulation the models have become once more faithful representations of the living plants.

The illustrations of the Hymenomycetes in this Guide are from Stevenson's *British Fungi*, by the kindness of the publishers, Messrs. Blackwood and Sons, Edinburgh. The illustrations of the other groups were prepared by Mr. Smith for this publication.

WILLIAM CARRUTHERS.

DIAGNOSTIC CHARACTERS.

The Fungi represented in the Models are the larger forms. They belong to the several Orders of which the diagnostic characters are given in the following key :—

CLASS I. BASIDIOMYCETES.—Spores borne *on* more or less club-shaped cells—basidia.

SUB-CLASS I. HYMENOMYCETES.—Spore-bearing surface or hymenium exposed during development.

Order I. *Agaricineæ.*—Hymenium spread over the surface of lamellæ or gills.
„ II. *Polyporeæ.*—Hymenium lining the interior of tubes.
„ III. *Hydneæ.*—Hymenium spread over spines.
„ IV. *Thelephoreæ.*—Hymenium smooth and horizontal.
„ V. *Clavarieæ.*—Hymenium smooth and vertical.
„ VI. *Tremellineæ.*—Hymenium covering entire surface. Gelatinous.

SUB-CLASS II. GASTEROMYCETES.—Spore-bearing surface or hymenium enclosed until maturity.

Order VII. *Phalloideæ.*—Hymenium enclosed in a volva with a middle gelatinous layer—at maturity volva ruptured and hymenium exposed.
„ VIII. *Lycoperdaceæ.*—Hymenium enclosed in a double dehiscent peridium—spores borne on a capillitium.
„ IX. *Sclerodermeæ.*—Hymenium enclosed in a single, dehiscent, thick peridium opening at the apex irregularly ; capillitium absent or scanty.
„ X. *Hymenogastreæ.*—Hymenium enclosed in a single indehiscent peridium. Capillitium absent. Subterranean.

CLASS II. ASCOMYCETES.—Spores borne *within* more or less tubular cells—asci.

SUB-CLASS I. DISCOMYCETES.—Spore-bearing surface more or less basin-shaped, exposed. Bright coloured.
„ II. PYRENOMYCETES.—Spore-bearing surface flask-shaped, spores escaping through an ostiole. Black.
„ III. TUBERACEÆ.—Spore-bearing surface enclosed in an indehiscent peridium. Subterranean.

CLASS III. MYXOMYCETES.—Consisting of masses of free, moving protoplasm, plasmodia, forming sporangia enclosing large numbers of spores.

GUIDE TO THE MODELS OF FUNGI.

FUNGI are reproduced by microscopic cells named spores, which are the analogues of the seeds of flowering plants. The spores may be white, yellow, pink, red, brown, purple, or black; blue and green are very uncommon colours. The spores of the fungi represented by the models are either borne naked on a particular part of the surface of the fungus (*hymenium*), as in the *Agaricineæ*, *Polyporeæ*, etc.; naked within the substance of the fungus, as in the puff-balls, etc.; or in little transparent sacs (*asci*), as in the cup-fungi and some truffles.

CLASS I.—BASIDIOMYCETES.

Nearly six-sevenths of the models belong to the naked-spored fungi (*Hymenomycetes*). In the first order (*Agaricineæ*) the *hymenium* is spread over the surface of gills; when ripe, the spores fall from the *hymenium* as a fine powder.

A microscopic examination of a portion of the gill shows that the spores AA are borne on slender and delicate supports (*sterigmata*) BB. The cells at CC are the ordinary cells of the mushroom; the larger ones at DD are termed *basidia*. In all the *Hymenomycetes* the spores are produced in fours. The delicate threads proceeding from the germinating spores form the *mycelium*, which is usually white, and is popularly termed "spawn." From this mycelium the perfect fungus arises, reproducing the parent form.

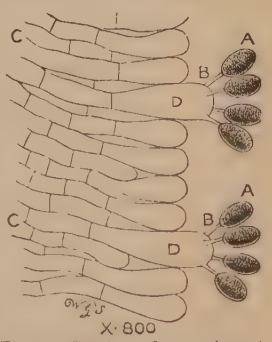


Fig. 1.—Section of a portion of the gill of a mushroom, showing the reproductive bodies or spores. (Enlarged 800 diameters.)

As a rule, the spores of the larger fungi are very short-lived, some retaining their vitality for only a few hours; while the mycelium is usually long-lived, waiting suitable conditions for growth.

Some of the higher fungi grow rapidly, and are fully developed from the spore in a few days, like some of those found on dung; while others take a much longer time. Some are very evanescent, living but a few hours; while others, which grow on trees, continue to increase in size for many years.

One of the smallest members of the *Agaricineæ* is *Coprinus*

radiatus, usually less than half an inch high, and so delicate that it may be destroyed by a breath. It is so light that seventy-two thousand specimens would be required to weigh an ounce, and yet each individual is built up of more than twenty-five million cells.

In studying the *Agaricineæ*, the first point of importance is the determination of the colour of the spores, whether they are white, pink, brown, purple, or black. The colour of the spores is frequently the same as that of the gills; but this agreement cannot be depended upon, as the colour of the gills often changes during growth. Thus the gills of the common mushroom are first white, then pink, next purple-brown, and ultimately black; while the spores are dark purple-brown. The colour of the spores can be easily observed by removing the stalk of the fungus, and laying the cap, with the gills under, on a piece of paper or glass. In a few hours the fallen spores will form a coloured impression of the gills.

SUB-CLASS I.—HYMENOMYCETES.

ORDER I.—AGARICINEÆ.

GENUS I.—AGARICUS L.

The genus *Agaricus* is divided into five series by the colour of the spores:—

1.	White spores	Leucospori.
2.	Pink spores	Hyporhodii.
3.	Brown spores	Dermini.
4.	Purple spores	Pratellæ.
5.	Black spores	Coprinarii.

These groups, except the last, are well represented in the models, and the outlines on the back of the case show, by the tint of the paper on which they are drawn, the colour of the spores.

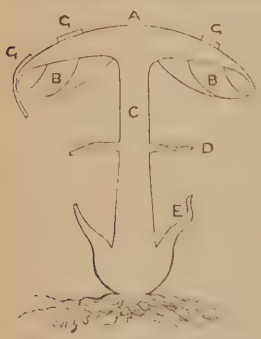


Fig. 2.—Section of Agaricus phalloides Fr.

These series, however, somewhat overlap, and some species exhibit relationships with other *Agaricineæ* not belonging to the genus *Agaricus*.

The colour of the spores having been determined, it is necessary to examine a section of the specimen, especially in relation to the attachment of the gills to the stem, and to observe the presence or absence of a ring (*annulus*) round the stem. The stem may be solid or hollow, and thickened upwards or downwards; it may be naked at the base, or spring from an enclosing wrapper (*volva*). The cap may be thick and fleshy, or thin and membranous; deeply depressed, or rounded and incurved. The gills may be thick or thin.

The material on which the fungus grows should be noted, whether on the earth, on dung, on dead or living plants or animals;

and the habitat must be observed, whether in woods, fields, roadsides, downs, etc. The odour and taste are also important.

The accompanying illustration (Fig. 2) shows the chief parts of an Agaric (*Agaricus phalloides*). A is the cap (*pileus*), from which depend at B B the gills (*lamellæ*); C is the stalk (*stipes*), furnished with a ring (*annulus*) at D, and a basal sheath at E, being the lower part of the volva. In the early stage of this species the volva enclosed the whole plant, and the warts G G on the pileus on the full-grown plant are remains of it. The annulus, similarly, is the remains of a fine membrane connecting the edge of the pileus with the stem, which was ruptured by the expansion of the pileus.

A young specimen of *Agaricus muscarius* is shown in section at the base of Fig. 5.

The gills are *free*, as at A, Fig. 3; *adnexed* when they just reach the stem, as at B; *adnate* at C; *sinuate* when they have a *sinus*, as at D; and *decurrent* when they run down the stem, as at E. The pileus is *umbonate*, as at F, and *depressed*, as at G.

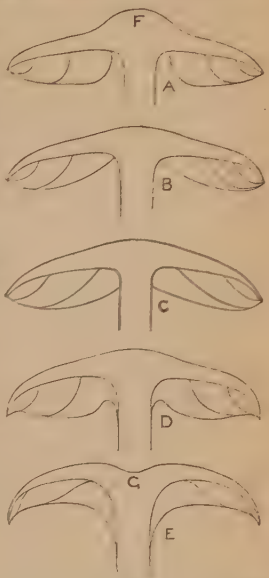


Fig. 3.—Sections of Agarics, showing attachment of gills.

Series I.—Leucospori.

Spores white, rarely greyish, dingy, or very faintly tinted. At present 453 British species of white-spored Agarics are known, of which forty-one are represented by models.

Sub-genus 1. *Amanita.*—Distinguished by the usually warty pileus, white gills free from or just touching the bulbous stem, which springs from a volva. All the species are terrestrial, and grow in woods and uncultivated places. They may be most readily distinguished from the true mushrooms by their occurrence in woods and not in pastures, by their permanently white gills, and their white and not purple-brown spores. There are sixteen British species of *Amanita*, of which four are represented by models.

Fig. 4.—Type form of Amanita. Agaricus vaginatus Bull. (One-quarter natural size.)

1. **Agaricus phalloides** Fr.—Pileus fleshy, shining, white or pale yellow, slightly viscid in wet weather, generally naked, but sometimes sprinkled with a few fragments of the broken volva; gills free and shining white; stalk

and ring white; volva commonly immersed in the soil, or buried among dead leaves and twigs.

This species is an extremely common inhabitant of woods. It has a penetrating and offensive smell, and is known to be poisonous. A case is recorded in the *Lancet* for 1879 by Mr. C. B. Plowright. Two boys ate part of a raw specimen about 3 p.m., and no ill results followed until midnight, when one boy became sick and delirious. He died, after two or three days, from the narcoto-irritant poison of the fungus.

2. **Agaricus muscarius** L.—Pileus scarlet-crimson, viscous in wet weather, and spotted with white or buff warts; gills at maturity sometimes of a pale sulphur-yellow tint; stalk bulbous, and furnished with a closely adpressed volva and broad ring. The flesh is sulphur-yellow under the skin. Varieties occur with a yellow, brown, or whitish viscous pileus.

Fig. 5.—A. muscarius L. (One-quarter natural size.)

This species grows in woods, generally near birch trees, sometimes among firs. The poisonous alkaloid *muscarine* is obtained from *A. muscarius*, about 200 lb. of the fungus being required for the production of 1 oz. of muscarine. *Amanitine* is also yielded by this species. It is known to be poisonous, causing a form of intoxication, and sometimes delirium and death. The Rev. M. J. Berkeley has recorded a case of "deep intoxication" from eating it. In past times a decoction of this fungus was used for killing flies; whence its name, from *musca*, a fly. A preparation said to be a solvent for corns is made from it.

3. **Agaricus pantherinus** DC.—Pileus olive-brown, viscid, and sprinkled with regularly arranged white warts; gills and flesh wholly and invariably white.

It resembles the two last species in being poisonous, and occurring in woods and pastures. It has sometimes been mistaken for the following species, *A. rubescens*, which is edible. A ready means of distinguishing them is to be found in the fact that, on being bruised or broken, *A. rubescens* always changes to a foxy-red colour, while *A. pantherinus* is permanently white.

4. **Agaricus rubescens** Pers.—Pileus reddish-brown, sometimes pale or almost flesh-coloured, not viscous, more or less covered with mealy, pale buff or whitish warts; stalk rufescent; volva almost obliterated.

This species is easily distinguished from its allies by the change in colour of its flesh noted already. The reddening, however, must be taken together with its other characters. Every Agaric which

reddens on being cut or broken is not necessarily edible. Some are probably poisonous, such as *Lactarius fuliginosus*, or worthless, if not dangerous, as *Russula nigricans*. It grows in great abundance in woods and parks, often embedded among dead leaves, and is specially common near beeches and firs. It is frequently attacked by larvæ. It is well known as an esculent in the French markets, where it bears the name of *golmelle*.

Sub-genus 2. *Lepiota*.—Distinguished by a usually floccose (not warty) pileus; gills generally free or remote from the stem; stalk hollow as a rule, and furnished with an annulus or ring. Most of the species are terrestrial, but one often grows on sawdust, another on tan, and another about stumps. They are found in rich grassy fields more commonly than in woods. Exotic forms frequently occur in greenhouses. Several species instantly change to blood-red, brown, or buff on being cut or broken; some have a bitter taste and a pungent and disgusting odour; others, however, are edible, and among the best of esculent fungi. There are thirty British species of *Lepiota*, four of which are represented by models.

Fig. 6.—Type form of Lepiota. Agaricus procerus Scop. (One-fifth natural size.)

5. **Agaricus procerus** Scop. The Parasol Mushroom.—Pileus when fully grown six or eight inches across, with a distinct central boss or umbo, the cuticle being broken up into broad, shaggy scales; gills free, or remote and white; stalk long and hollow, bulbous, finely variegated with minute scales, and furnished with a large, movable ring. The flesh on being cut changes to a faint brown hue, more marked in the stem than the pileus.

A. procerus grows in pastures, lowlands, and orchards, by grassy roadsides, and on heaths and commons among gorse and bracken; it sometimes grows in woods, and always prefers the neighbourhood of trees and bushes.

It is one of the most esteemed of edible fungi, many persons holding it, on account of its more delicate flavour, in higher estimation than the common mushroom; it is sold in the markets of France and Italy, and is said to have been sold in past times in Covent Garden market. A good ketchup can be made from *A. procerus*.

6. **Agaricus meleagris** Sow.—Pileus fawn-coloured, with minute velvety warts; gills white, rarely lemon-coloured; stem minutely scaly, with an evanescent ring.

This is a rare species, probably exotic in origin. It grows on spent tan in hothouses, and changes colour to a beautiful red on being cut or broken.

7. **Agaricus cepæstipes** Sow.—Pileus at first obtusely conical, clothed with separating plumose down; stalk floccose, bulbous, with a fugacious annulus.

This species is also an inhabitant of gardens, greenhouses, and stoves, where it usually grows on tan and leaves in densely compacted companies. It is usually a bright sulphur-yellow in colour, but frequently white. It is of a soft leathery consistency, and somewhat dry.

8. **Agaricus granulosus** Batsch.—Pileus and lower part of the stalk covered with a dense, granulose, orange or brownish meal.

A pretty species, common in woods and open grassy places, lawns, etc. Sometimes it is pure white.

Sub-genus 3. *Armillaria.*—There are twelve British species of *Armillaria*; the models represent different forms of a common species, *Agaricus melleus*. Most of the species are terrestrial, and grow in woods or pastures; others grow on stumps or tree trunks. The pileus is not warty, as in *Amanita*, or scaly, as in *Lepiota*, but often scurfy; the gills are variously attached to the stalk, which is normally furnished with an annulus; sometimes the annulus is absent, and then *Armillaria* is apt to be confused with *Tricholoma*. Most of the species are rare. The one modelled is very common.

Fig. 7.—Type form of Armillaria. Agaricus melleus Vahl. (One-third natural size.)

9. **Agaricus melleus** Vahl.—Pileus livid, yellowish, tawny or sooty brown, often downy and scurfy, or beset with small blackish scales; gills usually adnate, but sometimes more or less decurrent, as shown in Fig. 7; flesh yellowish or brownish; stalk externally rigid, spongy within; annulus usually large and sulphur-yellow, sometimes small, reduced to a few arachnoid threads, or entirely absent.

It usually grows in crowded clusters upon or near decaying stumps, or in woods, roadsides, and pastures near trees. It produces a vast number of white spores, which may be sufficiently abundant to whiten the stump on which it grows. Sometimes it grows from long black cords of compact mycelium termed *Rhizomorpha*. These black flattened cords are frequently found beneath the bark of old trunks and stumps, but it does not follow that all such growths belong to *A. melleus*. This species is frequently found on living trees.

A. melleus is sold in Continental markets, but in Britain it is looked upon as a worthless species for the table. It has caused constriction of the throat when eaten raw.

Sub-genus 4. *Tricholoma.*—There are more than seventy British species of *Tricholoma*, of which seven only are represented by models; all the species are truly terrestrial, and none are marked by a central depression of the pileus. The stem has neither volva nor ring; the gills are never free from the stem, but are distinctly *sinuate*. None have been recorded as poisonous, although a few may be suspected, as *A. sulphureus*, which has an offensive odour; *A. saponaceus*, which smells of soap; and *A. sejunctus*, which has a bitter taste.

Fig. 8.—Type form of Tricholoma. Agaricus saponaceus Fr. (One-third natural size.)

Sometimes species placed under *Russula*, *Lactarius*, and *Hygrophorus* are confounded with *Tricholoma*; but attention must be paid to the membranous sinuate gills of the latter, the rigid, fragile substance of *Russula*, the milky juice of *Lactarius*, and the waxy non-membranous gills of *Hygrophorus*.

10. **Agaricus sejunctus** Sow.—Pileus dull light yellow inclining to olive, streaked with brownish fibrils and viscid in wet weather; flesh fragile; gills broad, somewhat distant, shining white, not changing colour; stalk solid, smooth, shining white.

This is a rare species, with an odour like new meal and a bitter taste. It occurs usually in fir plantations.

11. **Agaricus rutilans** Schæff.—Pileus dry, variegated with purple and ferruginous-brown down on a yellow ground; flesh bright yellow; gills crowded, golden yellow; stalk large, light yellow, variegated with purple.

One of the handsomest of British Agarics. It is found in pine woods, frequently on or near stumps. Inodorous.

12. **Agaricus terreus** Schæff.—Pileus downy and mouse-grey in colour, umbonate, inclining to split, and very brittle; gills broad, sinuate, somewhat distant, white, then grey; stalk thick and solid. Inodorous.

This common species occurs in beech and mixed woods, and in hedges near beeches, sometimes in large numbers. There is a shining-white variety.

13. **Agaricus murinaceus** Bull.—Pileus dry, silky, scaly, mouse-coloured, and brittle; gills broad, distant, and cinereous; stalk stuffed, twisted, and variegated with minute scales. The whole plant becomes cinereous. Odour strong and alkaline; taste bitter.

A rare inhabitant of open woods and pastures.

14. **Agaricus sulphureus** Bull.—Pileus at first silky, then smooth and even; gills adnexed, somewhat thick and distant; stalk often curved, striate and fibrous.

A. sulphureus is not uncommon in mixed woods, and is probably poisonous. It is easily known by the bright sulphur-yellow colour of all its parts, and its strong odour of gas-tar water.

15. **Agaricus gambosus** Fr. St. George's Mushroom.—Pileus very fleshy, hemispherical or distinctly convex, with the margin incurved or inrolled; gills crowded and sinuate; stalk thick, solid, firm, and fleshy, not bulbous. The whole plant is usually biscuit-coloured.

There need be no fear of mistaking *A. gambosus* for any other species, if its season of growth, April and May, and its habitat, upon downs and in pastures, are remembered in connection with its habit of growing in "fairy-rings," often of immense size, and its very simple structural characters, as seen in the outline section. *A. gambosus* may often be seen growing in abundance on St. George's Day, April 23rd.

The odour is strong of fresh meal; generally pleasant, but sometimes rank and strong.

A. gambosus is edible, and is highly esteemed by some, and much eaten in France and Italy. It is too dry for the manufacture of ketchup, but may be further dried and kept suspended on strings for winter use. It should be gathered in dry weather; not after rain, when the plant is full of water.

16. **Agaricus albellus** Fr.—Pileus of typical specimens conical, then convex, fleshy, white, becoming grey when dry; gills attenuated near the stalk and not sinuate, crowded and white; stem thick, solid, somewhat bulbous. The odour is mild, and the taste, when raw, not unpleasant.

Fig. 9.—Type form of Clitocybe. Agaricus nebularis Batsch. (One-fifth natural size.)

A. albellus is a close ally of *A. gambosus*; the model exhibits an abnormal form; typical examples resemble small specimens of *A. gambosus*, but *A. albellus* grows in woods, and is rare. Sometimes a large number of very small specimens of *A. albellus* grow together in one conjoined mass; but a typical specimen would be represented by a solitary plant with a pileus about three inches in diameter.

Sub-genus 5. *Clitocybe*.—There are more than seventy British species of *Clitocybe*; ten of these are represented by models. The pileus is usually fleshy, plane, depressed, or infundibuliform with an involute margin; the gills are generally and typically decurrent, sometimes adnate, never sinuate

as in *Tricholoma*; the stalk is fibrous externally, elastic, spongy-stuffed, and often becomes hollow.

All the species of *Clitocybe* are terrestrial, and many grow late in the autumn or even after frosts in winter; several species are fragrant, some powerfully so; a few are esculent.

The species placed under *Clitocybe* must not be confounded with fungi which show a similar structural character in section, as *Paxillus*, where the spores are brownish-red; *Gomphidius*, where the spores are blackish; *Hygrophorus*, where the spores are white, but the whole substance is usually waxy-brittle or fatty; *Lactarius*, where the spores are white, but the flesh and gills are milky; *Cantharellus*, where the spores are white, but the gills are thick, swollen, and vein-like; or *Lentinus*, where the spores are white, but the entire plant is leathery and not terrestrial.

17. **Agaricus inornatus** Sow.—Pileus fleshy, livid, with a separable cuticle; flesh grey or variegated grey; gills at first adnate, then decurrent, crowded, grey; stalk thick, solid, grey. Odour mushroom-like.

A rare inhabitant of grassy places in woods.

18. **Agaricus odorus** Bull.—Pileus dull bluish-green in colour, fleshy, flattened or slightly umbonate, smooth and moist in wet weather; flesh greyish-white; gills adnato-decurrent, slightly distant, the same hue as pileus, but generally somewhat duller and paler; stalk stuffed, flexuous, often short and slightly bulbous, at first floccoso-fibrillose, then smooth; usually white villous at base.

A. odorus, which is common in woods, is easily recognised by its colour and fragrance. The latter has been compared with melilot, anise, almonds, meadow-sweet, and new-mown hay. The odour betrays the presence of the fungus in woods; it is retained for a long time in dried specimens. It is edible, but should be used with caution; it possesses a mushroom-like taste, with a suggestion of the odour of new hay.

19. **Agaricus dealbatus** Sow. Ivory Caps.—Pileus shining white like ivory and always dry, at first convex, then upturned, undulated and irregular; flesh white and dry; gills white, thin, crowded, adnate, scarcely decurrent; the stalk is dry, whitish, fibrous, at length hollow-stuffed.

Common in woods and pastures, and on downs.

A. dealbatus is esculent, its odour being pleasant, and the flavour when cooked agreeable. It, however (like the true mushroom and *Boletus edulis*), sometimes acts as a nerve irritant and causes profuse sweating or violent diarrhœa; for such attacks the late Dr. Bull, of Hereford, recommended a glass of strong hot whisky and water. It sometimes grows in profusion on mushroom beds; it is remarkable that in this position it often grows in company with *A. Orcella*,

a fungus from which it can be distinguished only after careful examination. *A. dealbatus* has white spores, *A. Orcella* pink spores; both are esculent.

20. **Agaricus elixus** Sow.—Pileus fleshy at the disc, thin near the margin, convex, often depressed but umbonate, margin at length undulated; flesh dirty grey-white; gills white, thin, decurrent, distant, connected by veins; stalk solid, sooty-whitish, velvety at the apex.

Not uncommon in woods, where it sometimes grows in large numbers; it is distinguished from all its allies by its very bibulous, brittle-soft flesh, which in wet weather becomes completely saturated with moisture, and then often breaks with its own weight: the colour changes at the same time from pallid to sooty brown.

21. **Agaricus opacus** With.—Pileus at first convex, then expanded, umbonate, repand; gills adnato-decurrent, very crowded, white; stalk stuffed, sub-fibrillose, unequal, flexuous.

This is a wholly white species, common in woods, remarkable for the superficial silvery glair with which the pileus is clothed, and which may be rubbed off with a touch. Sometimes mistaken for *A. dealbatus*.

22. **Agaricus maximus** Fr.—Pileus often a foot in diameter, infundibuliform but umbonate, whitish or pale buff, fleshy at the disc but thin towards the involute margin, dry; flesh white, soft; gills deeply decurrent, somewhat crowded, soft, whitish, not changeable; stalk attenuated upwards, elastic, spongy-solid, whitish.

One of the largest of British Agarics, not uncommon in grassy places. Odour weak, but pleasant; possibly edible.

23. **Agaricus geotropus** Bull.—Pileus pale tan-coloured, convex, then depressed, often umbonate, smooth, margin thin; flesh white; gills deeply decurrent, somewhat crowded, white; stalk solid, fleshy, attenuated upwards, white, becoming yellowish.

A. geotropus sometimes rivals *A. maximus* in size, but it is firmer and usually smaller, more elegant and slender; is one of the handsomest of all the British Agarics; it grows in woods and pastures, sometimes in fairy-rings of enormous size.

24. **Agaricus flaccidus** Sow.—Pileus shining, tawny-ferruginous, slightly fleshy, flaccid, at first umbilicate, then infundibuliform, never umbonate; flesh pallid, fragile when fresh, flaccid when dry; gills arcuate, decurrent, crowded, very narrow, whitish, becoming yellow; stem naked, shining, red-brown, elastic, tough, thickened and villous at the base.

A. flaccidus is common in woods and bushy places, where it usually grows gregariously in rings.

25. **Agaricus cyathiformis** Fr.—Pileus deeply depressed, umber-black, hygrophanous, becoming somewhat paler when dry, its margin remaining for a long time involute; flesh almost as dark as the pileus; gills decurrent, cinereous fuscous; stalk attenuated upwards, fuscous, fibrillose and somewhat reticulated, a little paler in colour than the pileus.

A. cyathiformis usually grows in woods, in fields, and on downs; it often appears late in the season, and may be commonly found after the frosts of winter have set in; it is a beautiful and easily recognised but variable species, sometimes cinnamon-brown, clay, or flesh-coloured, with whitish-brown or grey gills; the colours are usually very dark, especially in damp weather.

26. **Agaricus laccatus** Scop.—Pileus varying from a quarter of an inch to four or five inches in diameter, the average size about an inch, thin and scurfy, depressed, dry but very hygrophanous; gills adnate with a decurrent tooth, very broad, distant; stalk tough, fibrous, stuffed, equal, flexuous, twisted, same colour as pileus, white villous at the base.

A. laccatus is a very variable plant both in colour and stature. There are two colour-varieties: the more common rufous flesh-colour, carnation, or brick red, becoming ochreous on the pileus when dry; the less common being intense bright purple, becoming lavender on the pileus when dry.

This variety is usually known as *A. amethystinus* Bolt.; it varies from lavender to blackish-purple.

A. laccatus in all its forms grows among dead leaves in woods, generally singly, but sometimes in small connate groups.

Sub-genus 6. *Collybia.*—There are about sixty British species of *Collybia*, of which only five are represented by models. The species usually grow on dead stumps, twigs, or leaves; some root in the ground, and a few grow upon other fungi. The latter spring from *sclerotia*, little hard masses of compact mycelium, about the size of a grain of wheat; these sclerotia are formed in the ground or in the substance of other fungi. Most of the species are small, firm, slow-growing, and persistent; they continue in active growth till the winter has well advanced; several have a disgusting odour. *Collybia* is frequently confounded with *Marasmius*.

Fig. 10.—Type form of Collybia. Agaricus fusipes Bull. (One-quarter natural size.)

The margin of the pileus is at first involute; the stem is hollow, with a distinct cartilaginous bark; the gills are free or obtusely adnexed.

27. **Agaricus radicatus** Relh.—Pileus brown, flattened, more or less umbonate, often irregular, glutinous, wrinkled, and seldom more

than 2½ in. in diameter; gills adnato-sinuate, broad, thick, distant, shining white; the stalk is six inches or more long, pale brown, straight, rigid, generally twisted and attenuated upwards, the base continued as a tail-like root, sometimes six inches long and tapering to a point, the whole of this root being buried in the ground or in rotten wood. Odourless.

A. radicatus is extremely common, and generally grows in a solitary manner among grass on and near decaying stumps, in woods and by hedgesides. There is a wholly shining-white form, and a common small form with a pileus one inch or less across.

In the Botanical Department there is a drawing of a specimen of this species with a pileus 8½ in. in diameter and a stem (including the rooting base) 22 in. long.

The pileus is dry in its young state, glutinous (at the disc only) at maturity, and becomes dry again with age.

28. **Agaricus fusipes** Bull.—Pileus fleshy, rufescent-brown, smooth, dry, umbonate, often cracked; gills adnexed, broad, distant, firm, white, then pale brown, often spotted with foxy-brown stains; stalk rufous-brown, long, stuffed, cartilaginous externally, swollen in the middle, twisted, cracked, longitudinally striate and attenuated to a point at the rooting base.

This species is common on old stumps, where it usually grows in a densely cæspitose manner; it is very variable in size. It is generally considered esculent; the taste is not unpleasant, but the flesh is tough. Dr. Badham, in his *Esculent Funguses of Britain*, recommends this fungus for pickling.

29. **Agaricus maculatus** A. & S.—Pileus fleshy, compact, convexo-plane, even, smooth, margin thin, at first involute; gills sinuate, almost free, very crowded, linear; stalk hard, externally cartilaginous, somewhat ventricose, striate, base attenuated, rooted. Taste acid.

It is a typical example of a large *Collybia*, inhabiting woods, usually under beeches and firs; it may be at once known by its large size, and its creamy or pale buff colour, spotted and stained foxy-red; it sometimes becomes almost wholly rufescent.

30. **Agaricus velutipes** Curt.—Pileus tawny-yellow, convex, then plane, moderately fleshy, smooth, viscous; flesh yellowish, watery, and soft; gills slightly adnexed, almost free, somewhat distant, pallid yellow; stalk tough, externally cartilaginous, covered with dense brown—sometimes almost black—velvety down.

It sometimes springs from a luxuriant golden byssoid mycelium formerly called *Ozonium aureum* and *Byssus barbata*. The stem and mycelium are frequently luminous.

A. velutipes is a very common late-growing species; it may be found through the entire winter in crowded clusters on trunks and stumps of all kinds in the parks and gardens both in town and country; the stem is seldom so attenuated as shown in the model,

being usually only one or two inches in length, and generally three or four times as thick.

31. **Agaricus dryophilus** Bull.—Pileus slightly fleshy, tough, convexo-plane, usually depressed in the centre, margin at first inflexed; flesh white; gills almost free, but slightly sinuate, crowded, narrow, white, sometimes becoming sulphur-yellow; stalk cartilaginous, hollow, and more or less inflated (sometimes decumbent), smooth, rooting, often becoming yellow.

Very common among leaves in woods, parks, gardens, and hedgesides, where it grows at all seasons except mid-winter, in a solitary or gregarious manner; it is variable in colour, though usually some shade of livid brown or rufous. It is not edible.

Sub-genus 7. *Mycena*.—There are about eighty British species of *Mycena*, of which four are represented by models; most of the species are small, some minute, all are beautiful. The species of *Mycena* usually grow upon stumps, often in clusters; the pilei are generally convex, the stalks attenuated and fragile, and the gills non-decurrent. Most of the species are scentless, but some possess a strong alkaline odour or an odour of radish. Three of the milky *Mycenæ* exude pale or blood-red juice, one saffron-crimson juice, one yellow, and two a white juice like milk.

Fig. 11.—Type form of Mycena. Agaricus polygrammus Bull. (One-quarter natural size.)

In *Mycena* the pileus is commonly umbonate and never involute at the margin as in *Collybia*; some of the species are highly fragile and fugitive, others are firmer and more persistent. They all grow in autumn and early winter.

32. **Agaricus purus** Pers.—Pileus campanulate, then expanded, at length plane, umbonate, striate at margin, rose-coloured, varying to purple, lilac, violet, bluish-grey, white, or yellowish, highly brittle and semi-transparent; gills adnate, broad, ventricose, connected by a network of veins, pallid or whitish; stalk hollow, somewhat tough and rigid, smooth, same colour as pileus, and villoso-fibrillose at the base.

A. purus is extremely common in woods, hedgesides, and pastures from midsummer till early winter; it is a very variable but well-marked and easily recognised species. The taste and smell are faint and resemble radish.

33. **Agaricus polygrammus** Bull.—Pileus conical, then campanulate, slightly umbonate, dry and smooth, striate, with the margin frequently toothed, fuscous grey, livid, dull yellow, or rarely shining

white; gills broad in front, adnexed, almost free, distant, white, frequently marked with foxy-red spots and blotches; stalk rigid, straight, equal, naked, hollow, longitudinally grooved, silvery grey varying to livid and azure blue, and of shining metallic appearance.

A comparatively large and extremely common fungus on stumps. It appears in autumn or early winter, and grows in clusters. Odourless.

34. **Agaricus epipterygius** Scop.—Pileus campanulate, at length more expanded, never depressed, striate, covered with a very glutinous separable commonly cinereous—varying rufescent or yellowish—pellicle; gills sinuato-decurrent, cinereous, rufescent; stalk tough, hollow, even, rooted and fibrillose at the base, glutinous, yellow varying to pallid-cinereous or whitish.

This is a common, pretty, fragile, and glutinous species, inhabiting woods, where it grows on and among dead ferns, twigs, leaves, etc.; it is usually gregarious or cæspitose, but sometimes solitary. Odourless.

35. **Agaricus corticola** Schum.—Pileus hemispherical and thin, deeply striate, and obsoletely umbilicate, smooth or pruinose, generally blackish, becoming bluish, fuscous, or ashy-grey; gills adnate, sinuate, broad, distant, paler than pileus; stalk generally incurved, smooth or slightly furfuraceous, hollow, paler than the pileus.

A. corticola is very small and common on the mossy trunks of trees, where it grows abundantly from midsummer to early winter; soon withering in dry weather, but reviving with moisture.

Sub-genus 8. *Omphalia*.—There are nearly forty British species of *Omphalia*, two of which are represented by models. All the species are small; the pileus is generally depressed, the gills decurrent. Some species of *Omphalia* grow on the ground, others in moist situations among or upon dead twigs, leaves, mosses, etc. They are most commonly met with in wet weather, and in hilly and woody places. No species is known to be edible.

Fig. 12.—Type form of Omphalia. Agaricus umbelliferus L. (Natural size.)

36. **Agaricus pyxidatus** Bull.—Pileus membranaceous, pellucid, umbilicate, then infundibuliform, radiato-striate, very hygrophanous, smooth and red-brown when moist, paler and slightly silky when dry; gills decurrent, somewhat distant, narrow, flesh-coloured, then pale yellowish; stalk tough, equal, smooth or pruinose, pallid or red-brown.

This is frequent among grass in woods and pastures and on downs in autumn.

37. **Agaricus muralis** Sow.—Pileus somewhat membranaceous, tough, convex, umbilicate, then infundibuliform, radiato-striate, margin crenulate, red-brown ; gills decurrent, distant, pallid ; stalk short, stuffed, smooth, same colour as pileus.

This grows on old, damp, mossy walls, turf-banks, and turf-walls—hence its specific name. It is more common on the ground among moss and short grass in open places in woods.

Sub-genus 9. *Pleurotus.*—There are more than forty British species of *Pleurotus*, four of which are represented by models. Nearly all grow upon trunks or stumps, a small number on the ground. The stalk, when present, is usually lateral or excentric, but if the plants grow vertically they have frequently a central stem. The pilei are usually irregular. Most of the species appear in late autumn or early winter ; *Agaricus ostreatus* and *A. euosmus* are sometimes seen in the spring.

Fig. 13.—Type form of Pleurotus. Agaricus corticatus Fr. (One-sixth natural size.)

38. **Agaricus ulmarius** Bull.—Pileus fleshy, compact, horizontal, regular in form but excentric, convex and smooth, livid-whitish or ochreous-white in colour ; flesh white, tough ; gills sinuate or rounded behind, somewhat crowded, whitish ; stalk thick, solid, firm, curved, excentric, white.

The odour is powerful, and somewhat rank and acid.

A. ulmarius, although uncommon in some districts, is frequent in the neighbourhood of London, where it grows, singly or gregariously, upon old, unhealthy, and damaged trees, hastening their decay. It is usually seen upon the elm, generally high up among the branches. Occasionally it grows upon other trees, as the beech, oak, and poplar.

It is a "wound-parasite," growing on accidental wounds on trees ; the spores germinate on the wounded surface, and the mycelium penetrates the trunk and causes it to decay.

It is by some considered esculent, but the flesh is always tough and deficient in flavour.

39. **Agaricus subpalmatus** Fr.—Pileus fleshy, convex, then flattened, clothed with a thick, tough gelatinous corrugated pellicle ; gills rounded behind, broad, crowded, paler than pileus ; stalk solid, fibrous, soft, at length hollow, curved, smooth, fibrilloso-striate.

The imbricated, gelatinous pilei are usually glued together.

A. subpalmatus is a remarkable and beautiful species, said to be

rare, but common in the neighbourhood of London and other towns. It usually grows in clusters on squared timber, and may frequently be seen in wood-yards; it is less common on tree trunks and stumps, and generally appears late in the autumn or in early winter; sometimes it may be found in mid-winter. The whole plant is pale orange-buff, nankeen, or rufescent flesh-colour. It looks and cuts like raw veal.

40. **Agaricus ostreatus** Jacq. Oyster Fungus.—Pileus fleshy, soft, conchiform, somewhat dimidiate, smooth and moist, yellowish-brown, grey-brown, brown, or black-brown in colour; gills decurrent, anastomosing near the stem, somewhat distant, broad, white, sometimes turning light yellow; stalk short, firm, elastic, oblique, thickening upwards, white, hairy at base, sometimes obliterated.

This is a common species, and grows in clusters on the elm, poplar, willow, ash, apple, laburnum, and other trees; on rare occasions a single specimen may be met with as shown in the model, but it is usually cæspitose and imbricated; it appears in autumn and early winter, sometimes mid-winter or spring. Its specific name was suggested by the colour and shape of the pileus.

The odour is strong and disagreeable.

It has long been considered esculent, but is not generally esteemed. An allied plant named *A. euosmus*, said to be dangerous, is often confounded with *A. ostreatus*.

Mr. Plowright has recorded in *Grevillea* (vol. v., p. 64) the occurrence of this species on dry, cerebral matter in the skull of a stranded whale at King's Lynn.

41. **Agaricus tremulus** Schæff.—Pileus brownish-grey, hygrophanous, slightly fleshy, dimidiate, reniform, depressed and smooth, but often villous behind; gills adnate or decurrent, linear, somewhat distant, grey; stalk very short, but distinct, grey, terminating at the base in a woolly mass.

A small, variable, and rare species, growing on mosses, fungi, rotten wood, or on the ground.

Series II.—Hyporhodii.

Spores salmon, yellowish-salmon, pale rose, rubiginous, brownish-pink, or nankeen. Sometimes Agarics with clay-coloured spores, belonging to Series III. *Dermini*, are confounded with the *Hyporhodii*. There are 101 British species of *Hyporhodii*, four of which are represented by models.

Sub-genus 10. *Volvaria*.—There are nine British species of *Volvaria*, of which one is represented by a model. In its early stage the entire fungus is enveloped in a wrapper or *veil*, as shown in the small section on the left side of the illustration. This veil,

when ruptured, remains as a sheath or volva at the base of the mature fungus, as shown on the larger section. All the species of *Volvaria* are more deliquescent than Agarics in general. They grow in woods, gardens, by roadsides, and in hothouses. One remarkable species, *A. Loveianus*, grows parasitically upon the pileus of *A. nebularis*. None of the species are edible; the larger species are sometimes mistaken for mushrooms. One large species, *A. gloiocephalus*, has a very unpleasant odour and is said to be poisonous.

Fig. 14.—Type form of Volvaria. Agaricus volvaceus Bull. (One-fifth natural size.)

42. **Agaricus volvaceus** Bull.—Pileus campanulate, then expanded, obtuse, cinereous, streaked with adpressed black fibrils; gills free, flesh-coloured; stalk white, solid, and almost equal; volva large, lax.

A. volvaceus is a magnificent Agaric well represented in the model; it grows usually by grassy roadsides, and is often a great nuisance in hothouses from its profuse growth and luxuriance upon spent tan. When growing in a hothouse the mycelium often reaches from the floor to the shelves by climbing the wall. As in the case of the mushroom, the mycelium sometimes pierces the mortar between the bricks and produces a second crop outside the building.

It is remarkable that Sowerby has modelled an example with an ample ring round the stem: *Volvaria* should have none. Sowerby's ringed example, if true to nature, would suggest *Amanita*.

Sub-genus 11. *Pluteus*.—There are thirteen British species of *Pluteus*, only one of which is represented by a model. All the species are beautiful; some are very large in size, others are most brilliant in colour. All the species have ringless stems and free gills, and grow on or near stumps, or on sticks or sawdust. None are edible; the odour of some is faint and unpleasant. *Pluteus* agrees in structure with *Hiatula* and *Pluteolus*; but the spores are rosy, not white or brown.

Fig. 15.—Type form of Pluteus. Agaricus cervinus Schæff. (One-quarter natural size.)

43. **Agaricus cervinus** Schæff.—Pileus fleshy, campanulate, then expanded, when young smooth and slightly viscid, at maturity dry, fibrillose and streaked, fuliginous, sometimes yellowish-brown; the flesh is white and firm; gills free, crowded, ventricose, white, then flesh-coloured; stem solid, firm, equal, white externally striate with black fibrils, sometimes excentric.

A. cervinus grows singly on and near stumps, and on sawdust. A most variable species.

It has been mistaken and sold for the true mushroom, which has a ringed, not naked, stem, and grows in pastures, not on stumps and sawdust.

Sub-genus 12. *Clitopilus.*—There are ten British species of *Clitopilus*, of which one only is represented by a model. *Clitopilus* agrees in structure and habit with *Clitocybe*, and partially with *Flammula*; but the spores are rosy, not white or brown. All the species are terrestrial, and many are strong-smelling; the gills are usually decurrent, never sinuate, and the pileus depressed at maturity.

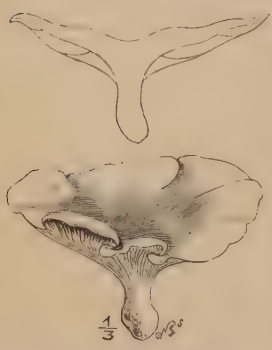


Fig. 16.—Type form of Clitopilus. Agaricus prunulus Scop. (One-third natural size.)

44. **Agaricus prunulus** Scop.—Pileus fleshy, compact, convex, then flattened, and at length slightly depressed, pruinate, dry, never viscid, white, rarely pale-cinereous; gills deeply decurrent, somewhat distant, white, then flesh-coloured; stalk solid, firm, naked, often striate, villous at base.

A. prunulus grows early in the autumn, in clusters or rings, on the borders of woods and in grassy, shady, but open places.

Sub-genus 13. *Leptonia.*—There are thirteen British species of *Leptonia*, one of which is represented by a model. *Leptonia* agrees in structure with *Collybia*, *Naucoria*, and *Psilocybe*; but the spores are rosy, not white, brown, or purple. The species are small, beautiful, brightly, sometimes brilliantly, coloured violet and blue; they grow in numbers in wet weather, on downs and pastures, as well as in marshy places; all are inodorous except *A. incanus*, which has the odour of mice.

Fig. 17.—Type form of Leptonia. Agaricus lampropus Fr. (One-half natural size.)

45. **Agaricus chalybeus** Pers.—Pileus violaceous, steel-blue, or blackish-blue, slightly fleshy, convex, somewhat umbonate, without striæ and squamulose; gills adnate, crowded, ventricose, light bluish-grey, with a paler edge; stalk dark blue, not dotted, cartilaginous, stuffed, smooth.

A. chalybeus is common in pastures.

Series III.—Dermini.

Spores clay-coloured, brown, yellowish-brown, orange-yellow, or

ferruginous-brown. There are 226 British species of *Dermini*, twelve of which are represented by models.

The *Cortinarii* are frequently mistaken for the larger *Dermini*; but they have bright-brown spores like iron-rust, an arachnoid veil, and a terrestrial habit. Many of the *Dermini* grow on or about stumps, trunks, branches, chips, etc.

Sub-genus 14. *Pholiota.*—There are twenty-eight British species of *Pholiota*, four of which are represented by models. *Pholiota* agrees in structure with *Armillaria* and *Stropharia*; but the spores are yellowish-brown, dark brown, or reddish, not white or purple. Nearly all the species grow on stumps.

Fig. 18.—Type form of Pholiota. Agaricus squarrosus Müll. (One-quarter natural size.)

46. **Agaricus aurivellus** Batsch.—Pileus brilliant yellow or reddish-yellow ornamented with dark adpressed spot-like scales, fleshy, campanulate, then convex, gibbous, moist, margin floccose when young, flesh yellow at maturity; gills sinuato-adnexed, broad, crowded, at first whitish, then straw-coloured, at length rusty-brown, never olivaceous-brown; stalk curved, stuffed, sub-equal, at first clothed with adpressed, floccoso-fibrillose scales, at length almost naked, yellow at maturity; ring silky, membranaceous. Odour faint.

A. aurivellus grows on old stumps and trunks, in woods and hedgerows, either in overlapping clusters or singly. It is a beautiful but uncommon species.

47. **Agaricus squarrosus** Müll.—Pileus dry, yellow-brown, shaggy with crowded, revolute, persistent brown scales, fleshy, umbonate or gibbous; flesh sulphury-yellow; gills adnate with a decurrent tooth, crowded, pallid olivaceous, then rusty; stalk attenuated at the base, stuffed, shaggy from the base to the ring with crowded revolute darker scales; ring membranaceous, entire or laciniate, floccoso-radiate, of the same colour as the scales.

A. squarrosus is very common, and grows in tufts on stumps and trunks, chiefly ash, from late summer to early winter; it is remarkable for its powerful and disagreeable odour, which is said, however, to be sometimes absent. It is said that when cooked it is not poisonous.

There are two remarkable varieties of this fungus: one named *A. Muelleri* Fr., which grows on beeches, with a pallid pileus and entire ring; the other *A. verruculosus* Lasch., which grows on maple, with a yellow scaly-papillose pileus.

48. **Agaricus spectabilis** Fr.—Pileus shining, golden or tawny, becoming paler, fleshy, compact, hemispherical, dry, torn into ad-

pressed pilose squamules, continued into the veil at margin; flesh hard, sulphur-yellow; gills adnate or adnato-sinuate, crowded, yellow, then rusty-brown; stalk solid, hard, ventricose, attenuated, and rooting downwards, mealy above, smooth or squamulose below the spreading persistent ring. Taste when raw, strong, disagreeable, bitter-aromatic.

A. spectabilis, represented by two models, is a very handsome bright golden-yellow species, which grows in clusters on oak stumps from August to November. It is often confounded with *A. aureus*, which, however, is always terrestrial.

49. **Agaricus mutabilis** Schæff.—Pileus cinnamon when moist, paler when dry, hygrophanous, slightly fleshy, usually obtusely umbonate, smooth, but when young sometimes squamulose; gills adnato-decurrent, crowded, pallid, then cinnamon; stalk rigid, stuffed, then hollow, equal or attenuated downwards, slightly shaggy as far as the ring, dark brown at the base; ring membranaceous, externally squamulose.

A. mutabilis, although very variable, is easily recognised in all its forms; it grows in dense tufts on stumps in spring, summer, and autumn. It is said to be not poisonous, and has sometimes been eaten.

Sub-genus 15. *Inocybe*.—There are forty-nine British species of *Inocybe*, of which two only are represented by models. The pileus in all the species is adpressed silky-fibrillose; gills usually sinuate, but varying adnate and decurrent, never cinnamon-pulverulent. All are terrestrial, and mostly nauseous smelling; none are edible.

Fig. 19.—Type form of Inocybe. Agaricus lanuginosus Bull. (One-quarter natural size.)

Inocybe (with the next sub-genus *Hebeloma*) agrees in structure with *Tricholoma*, *Entoloma*, and *Hypholoma*; but the spores are ferruginous-fuscous, not white, rosy, or purple.

50. **Agaricus scaber** Müll.—Pileus pale tan in colour, variegated with adpressed darker scales, conical, then convex; flesh firm, white, not reddish; gills slightly adnexed, thin, crowded, whitish, then dusky; stalk solid, firm, equal, white, silky-fibrillose or velvety. Common in woods. Almost scentless.

51. **Agaricus rimosus** Bull.—Pileus satiny-brown, with the whitish flesh exposed in longitudinal cracks, umbonate; flesh white; gills free or slightly adnexed, somewhat ventricose, whitish, then fuscous and rusty-brown, edge serrulated, pallid; stalk solid, firm, fibrous within, thickened and fibrillose at the base, mealy upwards, becoming yellowish or brownish, sometimes white; the thin veil fugacious. Odour earthy.

A. rimosus is common in woods and open ground, where it grows sub-gregariously; it is readily distinguished by its longitudinally fissured pileus.

Sub-genus 16. *Hebeloma*.—There are twenty-two British species of *Hebeloma*, two only of which are represented by models. *Hebeloma* agrees with *Tricholoma*, *Entoloma*, and *Hypholoma*; but the spores are clay-coloured, not white, rosy, or purple. In all the species of *Hebeloma* the pileus is smooth and somewhat viscid, with the edge at first incurved; the gills are sinuato-adnate; stem fleshy, fibrous, mealy at apex, sometimes showing slight traces of a veil or ring.

All the species are terrestrial, strong-smelling, and known or suspected to be poisonous.

Fig. 20.—Type form of Hebeloma. Agaricus fastibilis Fr. (One-third natural size.)

52. **Agaricus fastibilis** Fr.—Pileus pale yellowish or pale tan, compactly fleshy, convexo-plane, inclined to be repand, moist, clammy, smooth, the involute margin pubescent; gills sinuate, somewhat distant, rather broad, at first whitish, then dull clay-coloured, edge whitish, distilling drops in wet weather; stalk solid, fleshy-fibrous, stout, white-silky and fibrillose, white, varying pallid, often with traces of an incomplete ring, rarely with a perfect ring.

A. fastibilis grows, somewhat cæspitose, in woods and woody places, and by grassy roadsides near bushes and trees. Odour and taste of radish, but bitterish, heavy, and disgusting, like fœtid flax; poisonous.

An examination of the model will show that the poisonous *A. fastibilis* bears a considerable external resemblance to small specimens of *A. arvensis* or *A. hortensis*. The habitat of *A. fastibilis* is the same as that of *A. arvensis*, and these species are often confounded. *A. fastibilis* is sometimes exposed for sale in our markets as the true mushroom; it may make its appearance on mushroom beds and oust the mushroom. In distinguishing these attention must be paid to the odour; in one the scent is pleasant, in the other disgusting. *A. campestris*, the true mushroom, grows in open pastures, and has an ample ring, and pink, at length purple-black, free gills; *A. fastibilis* never has its gills pink or purple-black or free. In *A. arvensis* and *A. hortensis* the gills are at first rather clay-coloured or brown than pink, but they are never sinuate, and no mushroom has a clammy pileus.

Compare the illustrations of *A. fastibilis* and *A. campestris*.

53. **Agaricus crustuliniformis** Bull.—Pileus whitish-tan in colour, darker at the disc, fleshy, gibbous or convexo-plane with an

obtuse umbo, smooth, at first slightly viscid, not zoned; flesh hyaline when moist; gills rounded-adnexed, crowded, whitish, then clay-coloured, at length brown, distilling drops in wet weather; stalk stuffed, then hollow, stout, somewhat bulbous, white, naked, white-squamulose at apex; veil and ring absent. Odour strong, like prussic acid or radish, but fœtid and disgusting; very poisonous.

A. crustuliniformis is common in mixed woods, where it frequently grows in rings of immense size; it is often confounded with *A. fastibilis*, and as frequently mistaken for *A. arvensis*. It differs from the latter in its odour, in the attachment of the gills to the stem, in the absence of a ring, and in its habitat; the superficial resemblance between the two plants is however strong. As both fungi are very variable, no single character should be held conclusive; all the distinctive characters should be taken together.

Sub-genus 17. *Naucoria*.—There are forty-one British species of *Naucoria*, only one of which is represented by a model. *Naucoria* agrees in structure with *Collybia*, *Leptonia*, and *Psilocybe*; but the spores are ferruginous, not white, rosy, or purple. The species, however, differ much among themselves in details of structure and habit; they are generally small, and are either terrestrial or grow on stumps, twigs, sawdust, decaying leaves, grass, etc. No species of *Naucoria* is edible.

Fig. 21.—Type form of Naucoria. Agaricus semiorbicularis Bull. (One-half natural size.)

54. **Agaricus horizontalis** Bull.—Pileus slightly fleshy, convexo-plane, obtuse, even; gills rounded-free, broad, plane; stalk solid, very short, incurved, naked.

This is a small and somewhat rare species found upon elm trunks; the whole plant is pale cinnamon in colour.

Sub-genus 18. *Galera*.—There are fourteen British species of *Galera*, only one of which is represented by a model. *Galera* agrees in structure with *Mycena*, *Nolanea*, and *Psathyra*; but the spores are ochreous-ferruginous, not white, rosy, or purple. All the species are small in size and autumnal.

Fig. 22.—Type form of Galera. Agaricus tener Schæff. (One-third natural size.)

55. **Agaricus tener** Schæff.—Pileus smooth, truly conical, rich ochreous-buff when damp, pale ochreous when dry; gills adnate, crowded, cinnamon; stalk long, hollow, fragile, straight, shining buff.

A. tener is very common in pastures and gardens, in grassy places in woods, and by grassy roadsides; variable in size, pileus from ½ in. to 1¼ in. in diameter.

Sub-genus 19. *Tubaria*.—There are nine British species of *Tubaria*; one only is represented by a model. *Tubaria* corresponds in structure with *Omphalia*; but the spores are ferruginous, not white. All the species are small.

Fig. 23.—Type form of Tubaria. Agaricus furfuraceus Pers. (One-half natural size.)

56. **Agaricus furfuraceus** Pers.—Pileus pale cinnamon when wet, whitish-tan when dry, obtuse when young, umbilicate when mature, and silky-furfuraceous, not viscid; gills somewhat decurrent, bright cinnamon, more or less distant; stalk hollow, equal, furfuraceous when young, same colour as pileus, white-villous at base.

A. furfuraceus is very variable, and is frequent among chips in wood-yards, and on dead twigs in woods and hedgesides, where it usually grows in quantity.

Sub-genus 20. *Crepidotus*.—There are twelve British species of *Crepidotus*, of which one only is represented by a model. *Crepidotus* agrees in structure with *Pleurotus* and *Claudopus*; but the spores are ferruginous, not white or rosy. Most of the species are small, and grow on decaying stumps and branches; a few grow on decaying leaves, moss, and grass; they appear late in the autumn.

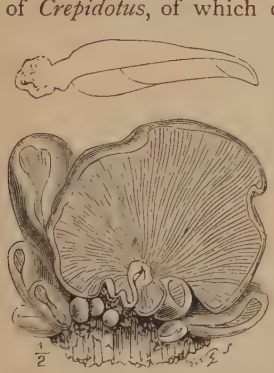


Fig. 24.—Type form of Crepidotus. Agaricus mollis Schæff. (One-half natural size.)

57. **Agaricus mollis** Schæff.—Pileus gelatinous-fleshy, obovate or reniform, undulated and lobed, smooth, pallid buff or livid brown; usually stalkless, but sometimes with a small, almost obsolete, strigose stalk; flesh soft, watery, whitish; gills crowded, whitish-grey, then pale cinnamon.

In imbricated specimens the lower pilei are generally much stained by the ferruginous spores from the gills of those above.

A. mollis is not uncommon on old stumps and logs; sometimes it grows luxuriantly on sawdust (like *Paxillus panuoides*), usually in clusters; sometimes it appears in mid-winter.

Series IV.—Pratellæ.

Spores typically dark purple, sometimes pale purple, frequently brownish-purple, in some instances almost brown. There

are a hundred British species of *Pratellæ*, eight of which are represented by models. The species with brownish-purple and brownish spores are often confused with the *Dermini*. Some *Pratellæ* produce few spores, and the gills remain white.

Sub-genus 21. *Psalliota*.—There are eleven British species of *Psalliota* (with many varieties); two species are represented by models. *Psalliota* agrees in structure and habit with *Lepiota*; but the spores are dark purple shaded with brown, not white; the gills are free, and the stem is furnished with a ring. They begin to appear at the end of summer, and several of the larger species are well-known esculents.

Fig. 25.—Type form of Psalliota. Agaricus campestris L. (One-third natural size.)

58. **Agaricus arvensis** Schæfl. Horse-Mushroom.—Pileus from three to twelve or more inches across, whitish or whitish-buff in colour, very fleshy, globoso-campanulate, then flattened, flocculoso-mealy when young, then slightly silky or squamulose, dry; flesh thick, compact, white, generally changing to yellowish, when cut or broken dull brownish-yellow or brownish-buff; gills free, ventricose, broader in front, white, clay-coloured, then reddish-fuscous, at length purple-black, often moist but never deliquescent; stalk three or four inches long and an inch or more thick, smooth, white, often swollen, hollow, with a lax floccose pith, obsoletely marginato-bulbous when young; ring large, spreading, or pendulous, appears double with the upper portion membranaceous, the lower thicker, more or less free at the circumference, and radiately split.

A. arvensis may be only a coarse variety of the true mushroom, *A. campestris*. *A. arvensis* grows in manured places, often among rank grass, by grassy roadsides, and in orchards, pastures, and on downs; it especially affects the neighbourhood of trees, hedges, bushes, and bracken. It often grows in rings of enormous size.

There are two well-marked varieties of the horse-mushroom: one, named *A. villaticus* Brond., is large and very scaly; another, var. *purpurascens* Cooke, growing in woods, has the pileus at length tinged with purple.

Esculent; when fresh and young this species is juicy and delicious, but it becomes tough and dry with age. It makes a good ketchup. Most of the market mushrooms from fields belong to this species.

A. arvensis requires to be carefully distinguished from the poisonous *A. fastibilis* and *A. crustuliniformis*, already described. Sometimes *A. radicosus*, notwithstanding its odour of prussic acid, is mistaken for this mushroom.

The frequent newspaper records of "gigantic mushrooms" generally refer to *A. villaticus*. In the *Transactions of the Woolhope Club*, 1874-6, p. 60, an account is given of three enormous mushrooms which lifted a flagstone weighing 80 lb. in the town of Worcester. A mushroom is mentioned in the *Gardeners' Chronicle* for July 28th, 1888, which measured 4 ft. in circumference and weighed 2 lb. 14 oz.

59. **Agaricus campestris** L. The Mushroom.—Pileus varying from white to rufescent-brownish, fleshy, convex, then flattened, dry, generally silky, sometimes squamulose; flesh thick and soft, becoming reddish or slightly fuscous on being cut or broken; gills free, ventricose, crowded, often becoming sub-deliquescent, salmon-white, soon changing to bright flesh-colour, rose-salmon, or pink, then dark purplish-brown, never clay-coloured or brown; stalk stuffed, firm, when young somewhat short and enlarged below, then equal, even or squamulose, white; ring spreading or reflexed, torn, sometimes deciduous.

This species, which grows in open pastures and on breezy downs, seldom near trees or bushes, is not usually more than three to five inches in diameter. It is, however, very variable both in stature and colour.

The mushroom appears under many striking varietal forms. The best marked of these are—*A. silvicola* Vitt., grows in woods; pileus smooth, shining, white; stalk elongated, somewhat bulbous: *A. pratensis* Vitt., grows in pastures, often near trees and bushes; pileus scaly-rufous; flesh changing to pink on being cut or broken: *A. vaporarius* Otto., pileus and stem furnished with a brown pilose coat: *A. costatus* Fr., grows in woods; pileus sulcate, repand: *A. rufescens* Berk., grows in pastures, rufous; gills at first white; flesh changing to bright pink, sometimes blood-red on being cut or broken: *A. exannulatus* Cooke, ring evanescent or obsolete: *A. albo-squamosus* W. G. Sm., pileus large, fleshy, furnished with large adnate white scales, the remains of a very thin volva; flesh dry, tough, changing to rose, yellow sienna, and brown on being cut or broken; gills crowded, changing to black, edge at first white; stalk tough, with a distinct pith, with slight remains of volva at base; spores few, pale in colour.

A. hortensis Cooke = *A. cryptarum* Letell., the cultivated form of mushroom beds: itself very variable; pileus fibrillose or squamulose, brownish. One of the forms of *A. hortensis* is named var. *Buchanani* Berk., pileus white, opaque, nearly smooth, depressed; another var. *elongatus* Berk., stem tall, base somewhat bulbous, approaching *A. silvicola*. These forms occur on mushroom beds.

Abnormal growths of mushrooms are very common, such as stalkless forms, and one or more mushrooms growing inverted on the pileus of another.

Mushrooms are highly nitrogenous plants, and they absorb the

nitrogen, not from the atmosphere, but from the organic nitrogen of the soil.

According to Prof. Church the constituents of mushrooms are :—

	In 100 parts.	In 1 lb. oz. grs.
Water	90·0	14 175
Albuminoids, etc.	5·0	0 350
Carbohydrates, etc.	3·8	0 266
Fat	0·7	0 49
Mineral matter	0·5	0 35

The same authority says that, though mushrooms contain, when dried, about half their weight of nitrogenous matter, the nature and feeding value of this matter has not been ascertained.

In the first attempts to raise mushrooms artificially, young living mushrooms were transferred from pastures to gardens and manure heaps ; and by taking full-grown mushrooms, breaking them up, steeping the fragments in water, and applying the infusion to a bed thought to be suitable. Mushrooms were first grown from spawn in the seventeenth century ; at that time gardeners and nurserymen sought in pastures for the supposed true spawn. The first successful attempts at mushroom growing from such spawn were made by introducing it into melon and cucumber beds at the time the melon seeds were sown. At the present day "virgin spawn" is obtained from old, rich pastures where horses and oxen have been feeding. This spawn is made up with partially dried cakes of compacted horse and cow dung and earth. If the cakes are too wet or too dry, the spawn will not "run" ; it runs best and with greatest vigour in a moist heat of from 70° to 75° Fahr. Cocoa-fibre waste is a good ingredient in mushroom beds : the spawn freely runs in it. In the prepared cakes the spawn, if good, will generally live in a resting state for five years. It has been known to live for twenty years.

Sawdust should never be used in the composition of mushroom beds. Other fungi grow freely on it.

In France it is usual to apply nitre or saltpetre to mushroom beds, for the purpose of increasing the size of the mushrooms.

In 1879 M. Charollois exhibited at the Central Horticultural Society of Paris a basket of mushrooms produced from spawn by sowing the spores on a plate of glass kept constantly moist and sprinkled with dung ; the spawn thus produced was transferred to a mushroom bed.

Mushrooms grown on strong manure are often offensive and uneatable.

Numerous fungi appear on mushroom beds, sometimes to the exclusion of the mushroom itself. The spores of good and worthless species alike are carried by the air, and, alighting by accident on prepared manure, find it a suitable habitat for germination and growth. In this way *Xylaria pedunculata* Fr. sometimes invades

and destroys mushroom beds. Its growth in the mycelium condition within the beds resembles very thick, black string, and this has sometimes been so abundant that many barrow-loads have had to be removed. If this be placed upon or buried in garden beds, it will often grow freely, and injure or even kill garden plants.

Like other plants, mushrooms are subject to disease, and diseased mushrooms are quite as likely to prove poisonous as diseased meat. Many microscopic moulds attack mushrooms, and no mushroom in a mouldy condition is fit for food. Mushrooms are frequently attacked by a disease in which the gills become very much thickened or totally obliterated; this is brought about by the attack of a parasitic fungus named *Mycogone alba* Letell., a stage in the development of a species of *Hypomyces* (see model of *H. lateritius*). Mushrooms are frequently sold in the markets in this condition; the mycelium thoroughly permeates the whole plant, and no doubt such mushrooms are dangerous if used as food.

Even perfectly sound mushrooms sometimes produce unpleasant symptoms. In the *Gardeners' Chronicle* for November 5th, 1881, the Rev. M. J. Berkeley records several cases of diarrhœa, one of great severity, from eating mushrooms. He says: "My remark in this and other cases of supposed poisoning with undoubtedly good mushrooms, is simply that the persons who gather them return hungry and fatigued, the mushrooms are badly cooked and hastily swallowed, so that they are irritating, tough, indigestible masses in the intestines. When properly masticated they are, on the contrary, perfectly wholesome." Cases of diarrhœa are not uncommon, and have been noticed with regard to *Boletus edulis* and other species.

An excellent ketchup is made from *A. campestris*, but very few mushrooms are apparently used in the "mushroom ketchup" of commerce. Home-made ketchup is seen under the microscope to be full of mushroom spores, but an examination of the mushroom ketchup of commerce discloses as a rule very few spores, in some none at all, and in others the spores of worthless *Coprini*.

Fig. 26.—Typeform of Stropharia. Agaricus æruginosus Curt. (One-third natural size.)

Sub-genus 22. *Stropharia.* — There are eighteen British species of *Stropharia*, only two of which are illustrated by models. *Stropharia* agrees in structure with *Armillaria* and *Pholiota*; but the spores are purple, not white or brown. In *Stropharia* the gills are adnate and the veil annular. The species grow on the ground, dung, or stumps; none are edible.

60. **Agaricus æruginosus** Curt.—Pileus glutinous, bluish-verdigris in colour, and flecked with white superficial scales, the colour being in the tinted slimy pellicle, which is soon washed off in wet

weather, leaving the pileus plane and dull yellowish; gills adnate, not crowded, whitish, then fuscous, becoming purple-brown; stalk hollow, equal, at first scaly or fibrillose below the ring, viscid, blue-green; ring distant.

A. æruginosus grows in dungy places in woods, fields, and road-sides, often appearing in very wet weather late in the autumn or in the early winter. Poisonous.

61. **Agaricus semiglobatus** Batsch.—Pileus hemispherical, never expanded, slightly fleshy, even, viscid, dull light yellow; gills adnate, very broad, dull purple-brown, clouded with black; stalk hollow, straight, equal, smooth, yellowish, generally stained with the blackish-purple spores, glutinous; ring incomplete, distant, viscous.

Extremely common on horse-dung from early spring to early winter. Said to be poisonous.

Sub-genus 23. *Hypholoma*.—There are twenty-one British species of *Hypholoma*, three of which are represented by models. *Hypholoma* agrees in structure with *Tricholoma*, *Entoloma*, and *Hebeloma*; but the spores are purple-black, not white, rosy, or brown. With one or two exceptions, all the species grow on stumps in clusters; the ring is represented by a circle of fine dark-coloured hairs or fibrils on the stem, and similar fibrils belonging to the veil adhere to the margin of the pileus; the gills are adnate or sinuate. None of the species are edible; many are bitter-nauseous in taste.

Fig. 27.—Type form of Hypholoma. Agaricus fascicularis Huds. (One-quarter natural size.)

62. **Agaricus sublateritius** Schæff.—Pileus yellow, with a reddish disc, dry and smooth; flesh white, becoming yellowish; gills at first faintly olivaceous-yellow, then dull olivaceous-purple; stalk pale yellowish, rusty-brown at the base, curved, attenuated downwards, furnished with a purplish-black fibrillose ring.

Generally grows in a cæspitose manner, and is common on old stumps; often confounded with other species of similar colour, especially with the common *A. fascicularis*. The taste is strong, nauseous-bitter, and this distinguishes it from some, but not all, of its allies. Probably dangerous.

63. **Agaricus fascicularis** Huds.—Pileus light yellow, with a reddish-brown disc, convex, then flattened, smooth, dry, the lower pilei of the crowded overlapping clusters generally stained with the purplish spores shed from the pilei above; flesh light yellow; gills

adnate, very crowded, sulphur-yellow, then sulphur-green, at length purplish-green; stalk hollow, thin, flexuous, fibrillose, yellow.

A. fasciculatis is extremely common; it appears from early spring to early winter, on or about stumps. Odour and taste bitter-nauseous, sickening. Poisonous.

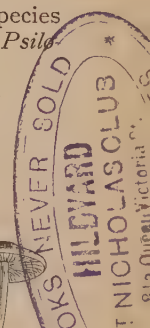
Specimens of *A. fasciculatis* were exhibited at the Woolhope Club, Hereford, in 1872, with stems 4 ft. long.

64. **Agaricus lacrymabundus** Fr.—Pileus whitish when young, then brown, becoming pale round the margin, convex, obtuse, irregular by the pressure of adjoining pilei, downy-scaly, overlying darker scales; flesh white; gills adnate, crowded, whitish, then brown-purple, edge whitish, distilling tear-like drops in wet weather; stalk hollow, somewhat thickened at the base, fibrilloso-scaly, brownish-white; cortina fibrillose, appendiculate, white.

A. lacrymabundus is common, and grows in clusters on the ground or on and about stumps in woods and fields. It is sometimes sold for the pasture mushroom, and often used as an ingredient for ketchup.

Sub-genus 24. *Psilocybe.*—There are twenty-two British species of *Psilocybe*, only one of which is represented by a model. *Psilocybe* agrees in structure with *Collybia*, *Leptonia*, and *Naucoria*; but the spores are purplish-black, not white, rosy, or brown. Nearly all the species of *Psilocybe* are terrestrial; some grow in clusters, all are scentless, and none are edible.

Fig. 28.—Type form of Psilocybe. Agaricus spadiceus Fr. (One-third natural size.)



65. **Agaricus semilanceatus** Fr.—Pileus acutely conical, resembling a miniature broad spear-head in section, never expanded, with the slightly striate margin at first bent inwards, viscid, and dull yellowish-brown in colour; gills ascending to the summit of the acute cone, adnexed, linear, crowded, becoming purple-black; stalk long, thin, tough, hollow, with a pith, flexuous, smooth, cortinate when young.

Common in the summer and autumn in dungy places among grass in pastures and by roadsides; it generally grows in numbers. Dr. Henry Wharton, in the *Transactions of the Essex Field Club* (vol. iv., p. 56), says this fungus has often been fatal to children.

GENUS II.—COPRINUS Pers.

The species of *Coprinus* do not wither or become putrescent, as in *Agaricus*, but dissolve into an inky fluid. All the species of *Coprinus* are fugacious; some are extremely rapid in growth. They

grow in rich and highly manured places, often on dung, some on rotten wood; several grow close to or inside human habitations, either on the earth outside or on the walls and ceilings inside.

Coprinus domesticus is common on moist cloths of all sorts, and is found in kitchens and sculleries upon dishcloths. There are thirty-nine British species of *Coprinus*, six of which are represented by models.

66. **Coprinus comatus** Fr.—Pileus fleshy, at first cylindrical and white, the cuticle breaking up into adpressed fleecy white scales: gills free, white, then flesh-coloured, at length purple and black, deliquescent; stalk hollow, shining-whitish; ring torn, movable, at length vanishing.

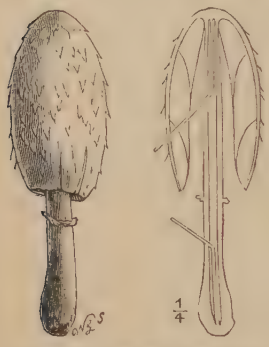


Fig. 29.—Coprinus comatus Fr. (One-quarter natural size.)

C. comatus is a large, handsome, and common fungus in parks, gardens, farmyards, orchards, and in waste and grassy places, generally near human habitations. It grows in scattered groups from early spring to late autumn; sometimes it appears in the winter. When the gills are just becoming tinged with pink or purple *C. comatus* is esculent and delicious; it is, however, somewhat mucilaginous, and not pleasing to all tastes. It is sometimes candied with sugar.

67. **Coprinus atramentarius** Fr.—Pileus ovate, ashy grey-brown in colour, slightly fleshy, somewhat silky or slightly squamulose, longitudinally sulcate or ribbed, often deformed or unequally flattened; gills free, ventricose, white, then dark purplish-brown, at length black, deliquescent; stalk furrowed, white, at first short, then elongated, with a slight fugitive ring where the edge of the pileus was adpressed to the stalk.

C. atramentarius is a large and common fungus. It usually grows in great clusters, often on or near rotten stumps or palings in gardens, parks, orchards, or roadsides, and generally near human habitations; sometimes it appears to be truly terrestrial. It grows from spring to early winter. Edible, preferred by some to *C. comatus*.

C. comatus and *C. atramentarius* are much used in the manufacture of inferior ketchup. Both species are sometimes termed "ink fungi," from the quantity of ink-like fluid into which they dissolve when over-ripe; as this fluid contains an immense number of spores of definite size, it has been suggested that important documents might be signed with it as a precaution against forgery.

The mycelium from which *C. atramentarius* springs usually produces two crops every year, one in the spring, the other in the autumn. If ripe specimens are gathered in spring and buried near

decaying posts or railings, the spores will in most cases produce a crop in the following autumn.

68. **Coprinus picaceus** Fr.—Pileus black, conical, white-patched; gills free, ventricose, dead ashy-black, and deliquescent; stalk tall, hollow, fragile, ringless, and white.

C. picaceus, sometimes termed the "magpie mushroom," is rare, and grows by grassy roadsides and in open grassy places in woods. Sometimes this plant is sterile and white, and the gills dissolve into a milk-white fluid. Considered poisonous and has an unpleasant odour.

69. **Coprinus niveus** Fr.—Pileus snow-white and mealy-floccose or squamulose, at first ovate, then expanded, at length revolute and torn; gills adnexed, narrow, becoming black and deliquescent; stalk at first short, but soon elongated, fragile, covered with snow-white down.

C. niveus is extremely common on horse-dung from early summer to early winter; it varies in size. It is frequent on mushroom beds, and sometimes so abundant that it prevents the growth of the mushroom.

70. **Coprinus micaceus** Fr.—Pileus somewhat membranaceous, at first dull yellow-ferruginous, then brown-fuscous, undulated, irregular, lobed, striate, longitudinally split, and covered with minute shining glistening particles; gills adnexed, black-brown, deliquescent; stalk hollow and soft, even, silky, white, then fibrillose.

C. micaceus is common, and generally grows in clusters near stumps and at the base of old rails and fences. Sometimes it appears to be terrestrial.

Fig. 30.—Coprinus micaceus Fr. (One-third natural size.)

71. **Coprinus plicatilis** Fr.—Pileus grey-fuscous, with a darker fuscous disc, at first ovoid, but soon expanded, at length depressed and beautifully radiato-furrowed; gills free, blackish-grey; stalk thin, hollow, equal, smooth, pallid-pellucid.

Common in fields and by grassy roadsides in damp, warm, and foggy weather in autumn. It sometimes grows in spring and summer when the weather is wet, cloudy, and warm. It is very short-lived, and is usually seen in perfection in the morning; after an hour or two it collapses and vanishes.

GENUS III.—BOLBITIUS Fr.

There are ten British species of *Bolbitius*; of these only one is represented by a model. The species do not deliquesce, as in

Coprinus, but merely become moist or mucid and putrefy ; the spores also differ in being ferruginous, and not black. The species, owing to their yellowish-ferruginous colours, are sometimes taken for *Cortinarii*, but they never have an arachnoid veil and commonly grow on dung or dungy places like *Coprinus*.

72. **Bolbitius fragilis** Fr.—Pileus light yellow, membranaceous, conical, then expanded, slightly umbonate, striate at margin, viscous ; gills adnexed, yellow, then pale cinnamon ; stalk hollow, naked, smooth, yellow.

Common on dung in summer and autumn.

Fig. 31.—Bolbitius fragilis Fr. (One-half natural size.)

GENUS IV.—CORTINARIUS Fr.

The genus *Cortinarius* is distinguished from other genera of the *Agaricineæ* by an arachnoid veil (*cortina*), by dry, persistent gills, which usually change colour to cinnamon, and by ferruginous spores. The species appear of various colours at different periods of growth and according as they are wet or dry ; all are terrestrial and autumnal. They are frequently confounded with species of *Pholiota* and *Hebeloma*, but these do not possess a cortina.

C. violaceus Fr. is looked upon as esculent. The Rev. M. J. Berkeley has recorded an undoubted case of poisoning by *C. bolaris* Fr. : the results were alarming, but not fatal ; the symptoms were great oppression of the chest and profuse perspiration. Two days after eating the fungus the salivary glands remained enlarged and tender. There are 184 British species of *Cortinarius*, of which eleven are represented by models.

The genus *Cortinarius* is divided into sub-genera.

Fig. 32.—Type form of Phlegmacium. Cortinarius fulgens Fr. (One-third natural size.)

Sub-genus 1. *Phlegmacium*.—Veil partial ; pileus fleshy, viscid ; stem firm, dry. There are fifty-two British species of *Phlegmacium*, of which three are represented by models.

73. **Cortinarius varius** Fr.—Pileus fleshy, bright ferruginous-tawny or yellow-tawny, very obtuse, slightly viscid, smooth, parts of the cortina attached to the margin ; flesh white ; gills sinuate, thin, somewhat crowded, violaceous-purplish or dark blue,

then ochraceous-cinnamon; stalk short, bulbous, compact, shining white, adpressedly flocculose, superior veil pendulous.

A rare inhabitant of woods.

74. **Cortinarius glaucopus** Fr.—Pileus dingy-tawny or clay-coloured, very fleshy, at length flattened and unequal, slightly viscid, floccoso-scaly, rarely even, often marked with a raised brown zone near the margin; flesh compact, white or yellowish; gills rounded, emarginate, crowded, bluish-grey, then cinnamon; stalk solid, very stout, at first short and bulbous, at length elongated and bulb disappearing, woolly (chiefly at apex), pallid azure blue, internally paler, yellow at base.

C. glaucopus is a large species frequent in pine woods, where it commonly grows in numbers.

75. **Cortinarius purpurascens** Fr.—Pileus brown, olivaceous-brown, or tawny-olivaceous, spotted, and often depressed round margin, which is sometimes marked with a raised brown zone, fleshy, glutinous; flesh azure blue; gills sinuate, crowded, pallid grey-blue, then cinnamon, violet-purple when bruised; stalk solid, thick, bulbous, fibrillose, pallid azure blue, becoming darker when touched.

Common in woods, sometimes cæspitose.

Fig. 33.—Type form of Myxacium. Cortinarius collinitus Fr. (One-fifth natural size.)

Sub-genus 2. *Myxacium.*—There are fourteen British species of *Myxacium*, only one of which is represented by a model. In *Myxacium* the pileus and stem are glutinous, and the gills adnate or decurrent.

76. **Cortinarius collinitus** Fr.—Pileus fleshy, convex, then expanded, orange-tawny, glutinous; gills adnate, somewhat crowded, whitish blue-grey or clay-coloured, then cinnamon; stalk solid, for the most part floccose and glutinous near the top; in young specimens showing a glutinous, fugacious ring; colour blue-grey or white, sometimes yellowish.

Common in woods.

Fig. 34.—Type form of Inoloma. Cortinarius callisteus Fr. (One-quarter natural size.)

Sub-genus 3. *Inoloma.*—There are nineteen British species of *Inoloma*, of which two are represented by models. In *Inoloma* the pileus is fleshy, dry, at first silky, not hygrophanous; stalk somewhat bulbous, with a single veil.

77. **Cortinarius violaceus** Fr.—Pileus dark purple, fleshy, convex, villous-scaly, margin at first involute; flesh soft, purple; gills distant, adnate, broad, intense violet-purple, then cinnamon; stalk bulbous, thick, spongy-solid, stout, tomentose, then fibrillose, dark purple; cortina woolly, azure-blue, stained with the ferruginous spores.

A handsome species, common in woods and open ground. Inodorous, but with a mushroom taste. Esculent. Care must be taken not to confuse this with other purplish species, several of which are either suspected or known to be poisonous; attention must be paid to the dry, downy pileus, the bright-purple flesh as seen when cut or broken, and especially the cinnamon-colour of the spores. *C. violaceus* is frequently confounded with *Agaricus nudus* Bull., a purple species with white spores.

78. **Cortinarius sublanatus** Fr.—Pileus fawn-coloured, at length ferruginous, slightly fleshy, umbonate, clothed with innate, floccose, fuscous squamules; flesh whitish; gills adnate, olivaceous-yellowish, then cinnamon; stalk solid, conico-elongated, clothed to the middle with fuscous down, which is continued into a fibrillose cortina, apex slightly violaceous, naked.

A rare inhabitant of woods.

Sub-genus 4. *Dermocybe.*—In *Dermocybe* the pileus is at first silky, then smooth, somewhat thin, not hygrophanous; stalk equal or attenuated downwards; veil single, fibrillose; flesh white or coloured. There are twenty-six British species of *Dermocybe*, two of which are represented by models.

Fig. 35.—Type form of Dermocybe. Cortinarius cinnamomeus Fr. (One-third natural size.)

79. **Cortinarius spilomeus** Fr.—Pileus reddish-brown or clay-coloured, smooth; gills adnate or sinuate, crowded, bluish-grey or violaceous, then cinnamon; stalk hollow, equal, white-lilac, variegated with rufous or tawny scales, furnished with a white cortina.

A pretty but uncommon inhabitant of woods; it sometimes grows in clusters.

80. **Cortinarius cinnamomeus** Fr.—Pileus thin, umbonate, silky or downy-fibrillose, then smooth, cinnamon; flesh yellowish; gills adnate, crowded, shining, light- or golden-yellow, saffron-tawny, red-cinnamon or blood-red; stalk stuffed, then hollow, thin, equal, yellowish and fibrillose, with the yellowish cortina.

C. cinnamomeus, a most variable species as regards the colour of the gills, is common in mixed woods.

Sub-genus 5. *Telamonia*.—In *Telamonia* the pileus is moist and hygrophanous, at first smooth or sprinkled with a few whitish fibrils, the remains of the veil; stalk annulate, or peronate with scales. There are forty-two British species of *Telamonia*; of these three are represented by models.

Fig. 36.—Type form of Telamonia. Cortinarius armillatus Fr. (One-fifth natural size.)

81. **Cortinarius bulbosus** Fr.—Pileus brown when moist, red-brown when dry, campanulato-expanded, margin torn, fibrillose; flesh brownish when moist, whitish when dry; gills adnate, somewhat distant, brown-cinnamon, never violet; stalk solid, bulbous, paler than pileus, yellowish at base, with a white fugacious ring.

A rare inhabitant of woods.

82. **Cortinarius evernius** Fr.—Pileus purple-brown, brick-red when dry, hoary-grey when old, very hygrophanous, then fragile, conico-campanulate, then flattened and obsoletely umbonate, when young slightly silky with white fibrils, at length rimosely incised and torn into fibrils; flesh same colour; gills adnate, ventricose, broad, distant, violaceous-purple, then paler, at length cinnamon; stalk stuffed, soft, equal, slightly striate, violaceous, becoming pale, obsoletely zoned with the veil.

Frequent in woods.

83. **Cortinarius gentilis** Fr.—Pileus tawny-cinnamon, yellow when dry, very hygrophanous, varying to silky, conico-expanded, acutely umbonate, rimosely incised; flesh thin, same colour; gills adnate, thick, distant, tawny-cinnamon; stalk stuffed, then hollow, equal, fibrillose, same colour as pileus when moist, furnished with one or more generally oblique zones, sometimes floccose below the ring, yellow.

C. gentilis is a small species common in woods, chiefly of pine, where it grows in a gregarious manner.

GENUS V.—GOMPHIDIUS Fr.

In *Gomphidius* the gills are mucilaginous, decurrent, distant, and soft, and the spores purplish-black; the veil is viscoso-floccose. The species are terrestrial and chiefly found in pine woods. There are four British species of *Gomphidius*; two of these are represented by models.

84. **Gomphidius glutinosus** Fr.—Pileus fuscous-purple, often mottled with black, fleshy, convex, then plane or slightly depressed, smooth, very glutinous; gills deeply decurrent, distant, branched, mucilaginous, whitish, then cinereous; stalk solid, whitish, slightly

thickened and yellow at base, viscid with the veil, fibrillose or furnished with black scales; cortina forming a fugacious ring.

G. glutinosus is frequent in pine woods from late summer to early winter. A beautiful variety of this plant, generally small, has a bright rose-coloured pileus and white stalk, rosy at the base.

Possibly edible, but taste watery-mouldy.

Fig. 37.—Gomphidius viscidus Fr. (One-fifth natural size.)

85. **Gomphidius viscidus** Fr.—Pileus rich red-brown, at first campanulate, then expanded and umbonate, slightly viscid, shining when dry; flesh bright yellowish; gills deeply decurrent, distant, somewhat olive, at length fuscous-purple; stalk solid, nearly equal, yellowish, rhubarb-coloured within, scaly-fibrillose, not very viscous; cortina forming a floccose fugitive ring.

G. viscidus is a large and extremely handsome fungus, common in woods, chiefly of pine, from late summer to late autumn. Odour not unpleasant. The Rev. Wm. Houghton says that *Gomphidius glutinosus* and *G. viscidus* are quite wholesome and very good.

GENUS VI.—PAXILLUS Fr.

In *Paxillus* the gills are membranaceous, somewhat branched, and anastomosing; spores ferruginous or dingy white: the pileus is at first involute. Some species are terrestrial; others grow on stumps, sawdust, etc. There are fifteen British species of *Paxillus*; one is represented by a model.

86. **Paxillus involutus** Fr.—Pileus deep dull ochrey-ferruginous, darker in wet than dry weather, at first downy, then smooth, convexo-plane, then depressed, somewhat viscid when moist, shining when dry, villous at the very involute margin; flesh compact, pallid, mottled; gills dull yellow, decurrent, branched, anastomosing and forming pores near the stem, becoming brownish when touched: sometimes the gills are entirely replaced by pores, and then it resembles *Boletus*; stalk fleshy, firm, solid, thickened upwards, naked, dingy yellowish, spotted.

Fig. 38.—Paxillus involutus Fr. (One-quarter natural size.)

P. involutus is a very common and somewhat large inhabitant of woods and open places near woods, from summer to early winter. Said to be edible, and highly esteemed in Russia; it is eaten in Belgium. It was tried

by the Woolhope Club at Hereford, in 1870, but was not much approved.

Sometimes a brilliant yellow parasitic mould grows upon the gills of *P. involutus*; this is *Hyponyces chrysospermus* Tul.

GENUS VII.—HYGROPHORUS Fr.

In *Hygrophorus* the pileus is viscid or watery; the gills are not truly membranaceous, but thick and of a waxy consistence, with a sharp edge; the spores are white. All the species are terrestrial. There are fifty-eight British species, of which nine are represented by models. Most of the species are fragrant or pleasantly scented, but *H. fœtens* Phil. has a disgusting nauseous odour.

87. **Hygrophorus eburneus** Fr.—Pileus convexo-plane, margin at first involute and pubescent, even, very glutinous in rainy weather; gills decurrent, distant, veined; stalk stuffed, then hollow, glutinous, apex granular.

H. eburneus is a somewhat frequent inhabitant of woods, pastures, and grassy roadsides in autumn. The whole fungus is shining white. Said to be edible; odour weak, not unpleasant.

88. **Hygrophorus cossus** Fr.—Pileus glutinous, somewhat ochraceous, margin never pubescent; stalk granular at apex, tinted, faintly ochraceous.

H. cossus is frequent in woody places. It greatly resembles *H. eburneus* in appearance; it is easily distinguished by a very powerful odour, like that of the goat-moth.

89. **Hygrophorus hypothejus** Fr.—Pileus at first olivaceous, glutinous, cinereous, pale and yellowish, orange, or rarely rufescent, fleshy, convex, then depressed, somewhat streaked; flesh thin, white, becoming light yellow; gills decurrent, distant, pallid-whitish, soon yellow or flesh-coloured; stalk stuffed, equal, even, viscous, rarely spotted with the veil, at length hollow; the fugitive partial veil is at first floccose, cortinate, and annular.

H. hypothejus is frequent in pine woods in late autumn and early winter; it varies much in size and colour.

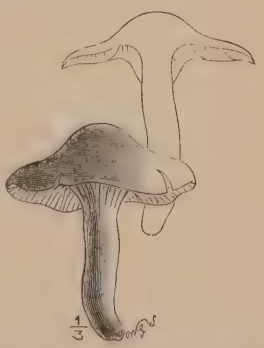


Fig. 39.—Hygrophorus pratensis Fr. (One-third natural size.)

90. **Hygrophorus pratensis** Fr.—Pileus very fleshy at the disc, thin at the margin, convex, then flattened, smooth, moist in rainy weather, often cracked in dry weather; flesh firm, white; gills at first arcuate, then decurrent, distant, thick, firm, brittle,

connected by veins; stalk spongy-stuffed, attenuated downwards, smooth, naked.

H. pratensis is common in pastures and on downs from autumn till early winter. It is wholly light yellow-tawny and almost top-shaped.

Edible, but without much flavour.

91. **Hygrophorus virgineus** Fr.—Pileus fleshy, margin involute when young, convex, then plane, at length depressed, often floccose and widely fissured and cracked when dry; gills decurrent, distant, rather thick; stalk short, stuffed, firm, attenuated at base, becoming even and naked.

H. virgineus is small and a common inhabitant of pastures and downs, growing in scattered groups in autumn and early winter. The whole plant is white, hygrophanous, and brittle.

Edible; taste like the "Fairy-ring Champignon."

92. **Hygrophorus ceraceus** Fr.—Pileus convexo-plane, slightly pellucid, striate, and viscid; gills adnato-decurrent, almost triangular; stalk hollow, unequal, flexuous, compressed, and smooth.

H. ceraceus is a small and fragile species common in pastures and woods and on downs, where it grows in numbers. The whole plant is unchangeable waxy-yellow.

93. **Hygrophorus puniceus** Fr.—Pileus viscid, deep, shining blood-red, becoming variegated whitish-crimson in dry weather, slightly fleshy, at first campanulate, then becoming flattened, irregular, and lobed; flesh blood-red, waxy; gills ascending, ventricose, adnexed, almost free, thick, distant, whitish-yellow or yellow-reddish near the stem; stalk solid, stout, then hollow, ventricose, striate, squamulose at the apex, same colour as the pileus or variegated with yellow, white at the base.

H. puniceus is the largest and handsomest of the *Hygrophori*. It is frequent in pastures and on downs.

94. **Hygrophorus conicus** Fr.—Pileus varying in colour from scarlet, through ochre, to whitish sulphur, greenish, and livid, sometimes conical, acute, somewhat membranaceous, smooth, commonly lobed, then expanded and cracked, viscid when moist, shining when dry; flesh watery; gills attenuato-free, ventricose, thin, somewhat crowded, white, sulphur-yellow, sometimes reddish near stem; stalk hollow, cylindrical, straight, fibroso-striate, extremely fragile.

Very common in pastures and on downs, and changing to black on being touched or broken. It commonly becomes jet-black soon after maturity, though occasionally, in dry weather, individuals do not change colour, but remain permanently yellow or scarlet.

95. **Hygrophorus psittacinus** Fr.—Pileus bright yellow, variegated with a bright-green glutinous substance, campanulate, then

expanded, smooth, umbonate, very glutinous, becoming paler in colour and less viscid with age; gills adnate, ventricose, rather thick, broad, somewhat distant, generally green; stalk hollow, equal, a little tough, wholly greenish or green at apex.

H. psittacinus, sometimes termed the "paroquet mushroom," is frequent in pastures and on downs in the autumn. It is easily recognised by its peculiar though variable colours.

GENUS VIII.—LACTARIUS Fr.

The members of the genus *Lactarius* are easily recognised by every part of the fungus exuding white or coloured milk on being bruised or broken. Nearly all the species are terrestrial. The pileus is firm and fleshy, at length depressed, often zoned; gills membranaceous-waxy, slightly rigid, adnato-decurrent, often branched. A few of the species are esculent; the majority are acrid and poisonous, some extremely so. There are fifty-seven British species of *Lactarius*, nine of which are represented by models.

Fig. 40.—Lactarius subdulcis Fr. (One-third natural size.)

96. **Lactarius torminosus** Fr.—Pileus pallid flesh-colour, varying ochraceous and white, somewhat zoned, with a shaggy-fibrillose, buffish or whitish, at first involute margin, somewhat fleshy and fragile, depressed, viscid when moist; flesh pallid; gills very thin, crowded, paler than pileus; milk copious, white, unchangeable; stalk stuffed, then hollow, delicately downy, then smooth, dry.

Very common in woods. The whole plant is highly acrid and poisonous, but inodorous.

Hypomyces torminosus Tul., a parasitic white mould, changing to yellow and dark-brown, is frequent on the gills of *L. torminosus*.

97. **Lactarius blennius** Fr.—Pileus pallid olivaceous or grey, fleshy, plano-depressed, glutinous, often concentrically spotted or irregularly zoned, margin incurved and downy in the young plant; flesh rigid, white; gills adnato-decurrent, thin, crowded, white, becoming cinereous when bruised; milk white, unchangeable; stalk thick, stuffed, then hollow, almost equal, even, viscid, pallid-grey.

L. blennius is common in woods from autumn to early winter. Acrid, poisonous.

98. **Lactarius pyrogalus** Fr.—Pileus cinereous-grey or grey-yellowish, firm, convex, then plane, at length depressed, smooth, moist in wet weather but not viscid, dry in dry weather, somewhat zoned; flesh white; gills adnato-decurrent, thin, somewhat distant,

light yellow or ochraceous; milk abundant, white, unchangeable; stalk stuffed, then hollow, often attenuated downwards, smooth, pallid-white or dingy.

Common in woods and pastures. Acrid, poisonous.

99. **Lactarius piperatus** Fr.—Pileus white, fleshy, rigid-brittle, margin at first involute, umbilicate, at length infundibuliform, smooth, zoneless; flesh white, slightly changing to brownish on being broken; gills decurrent, crowded, narrow, at first arcuate, at length extended upwards, white, sometimes slightly yellow-spotted; milk abundant, white, unchangeable; stalk solid, stout, often attenuated downwards, white, obsoletely pruinose.

A large species, common in woods. Very acrid, poisonous when raw; inodorous; sometimes placed among esculents, since the heat of cooking is said to dissipate the poison, as in many other acrid fungi. The use of so hard and acrid a plant for food is undesirable.

100. **Lactarius vellereus** Fr.—Pileus white or pallid-tan, depressed, zoneless, margin sloping down, slightly pubescent; flesh white, changing to dull yellowish on being broken, but becoming white again; gills arcuate, adnato-decurrent, thickish, somewhat distant, rather broad, pallid, watery-white; milk white, scanty; stalk solid, stout, equal, thinly downy.

L. vellereus, common in woods, is not generally so large as the last, but more rigid and with less milk. Bitter-acrid, poisonous.

101. **Lactarius deliciosus** Fr.—Pileus dull orange, dull yellowish, or reddish-orange, becoming paler with age, depressed in the centre, at length infundibuliform, margin naked, involute, smooth, slightly viscid, usually zoned with darker lines or irregular spots; flesh soft, not compact, pallid-ochreous, in parts bright orange; gills somewhat decurrent, crowded, narrow, arcuate, saffron-yellow, becoming paler, always turning green when bruised; milk bright orange, changing to green, aromatic; stalk stuffed, then hollow, becoming fragile, usually attenuated downwards, the same colour as the pileus or paler, usually orange-spotted.

L. deliciosus is locally frequent, sometimes abundant, in woods of Scotch fir and larch. It often attains a large size, and may be immediately known from all other fungi by its change from orange to green on being bruised. Esculent; when young and fresh one of the best; sold in Italian markets. The best method of cooking it is, after cleaning, to boil in milk, slightly fry in butter, and serve in hot milk. When it is attacked by the reddish parasitic fungus *Hypomyces lateritius* Tul., it should not be eaten. (See model, No. 203.)

102. **Lactarius rufus** Fr.—Pileus dark brown or cinnamon-rufous, umbonate, then depressed, at length infundibuliform, but always

umbonate, zoneless, dry, at first silky-floccose, but soon becoming smooth and shining, margin involute when young and somewhat whitish-tomentose; flesh pallid-brown, not firm; gills adnato-decurrent, crowded, ochraceous or brownish-ochre; milk white, not changing; stalk stuffed, somewhat fragile, equal, rufescent, slightly downy and white, pubescent at the base.

Common in mixed woods, possibly more abundant in fir plantations. Taste bitter-acrid, scentless. Poisonous.

103. **Lactarius fuliginosus** Fr.—Pileus fleshy, becoming plane, then depressed, spongy-firm, margin at first inflexed, sometimes uneven, flexuous, zoneless, very dry and somewhat downy or velvety, at length naked; gills rounded-adfixed, then decurrent, somewhat thin and distant, whitish, then rich yellow-ochraceous; milk white, usually changing to rose, and then saffron-yellow; stalk spongy-stuffed, almost equal, ranging in colour from white, through buff and tan, to dull red or smoky.

L. fuliginosus is common in woods, and is easily known by the "coffee-and-milk" colour of the pileus, and the rapid change of the hard whitish flesh when broken to a reddish saffron-colour. Acrid-nauseous; taste sometimes mild, and not unpleasant; odour nauseous and pungent, probably poisonous.

104. **Lactarius volemus** Fr.—Pileus zoneless, plano-convex, at length depressed, margin at first bent inwards, even, dry; gills adnato-decurrent, thin, crowded, whitish or yellowish, brownish when bruised; milk abundant, white, sweet, sometimes becoming yellowish; stalk stout, firm, solid, almost equal, golden or golden red-brown like the pileus.

L. volemus grows in woods; it is usually large in size and locally frequent, but generally uncommon; it is very easily recognised by its rigid flesh and beautiful rich rufous and golden hues, like those seen on some ripe and richly coloured pears. Esculent, considered delicious, pleasant-tasted even when uncooked.

GENUS IX.—RUSSULA Pers.

In *Russula* the pileus is fleshy, at length depressed; stem shining; gills rigid, fragile, sharp-edged. All the species are terrestrial, and allied to *Lactarius*, but never milky; some are extremely variable in colour, and consequently difficult to name without experience. Many of the species are acrid and poisonous; a few are mild and edible; but, owing to the variations in colour, mistakes are common with beginners. There are sixty-five British species of *Russula*; five only of these are represented by models.

Fig. 41.—Russula aurata Fr. (One-quarter natural size.)

105. **Russula adusta** Fr.—Pileus whitish-pallid, generally clouded with dark smoky stains as if scorched, fleshy, compact, depressed, at length somewhat infundibuliform, margin at first inflexed, smooth, without striæ, flesh not changing; gills adnate, then decurrent, thin, crowded, white, then dingy, constant in colour; stalk solid, stout, same colour as pileus.

R. adusta grows in woods; it is local, frequent in some localities, rare in others.

106. **Russula sanguinea** Fr.—Pileus shining blood-red, often paler round the even, acute margin, fleshy, firm, obtuse, at length depressed and infundibuliform, gibbous at the disc, moist in damp weather; flesh firm, white; gills at first adnate, then decurrent, crowded, narrow, connected by veins, fragile, somewhat forked, shining white; stalk stout, spongy-stuffed, at first contracted at the apex, then equal, slightly striate, white or shaded with red.

R. sanguinea is one of a considerable number of the genus with crimson pilei, some edible, others poisonous. It is a somewhat uncommon inhabitant of woods, chiefly fir. Acrid, poisonous.

107. **Russula fœtens** Fr.—Pileus yellowish-brown, with a deeply striate, or ribbed, at length tuberculate margin, at first spherical, then expanded and depressed, rigid, viscid in wet weather; gills adnexed, crowded, connected by veins, at first exuding watery drops, whitish or pale yellowish, dingy when bruised; stalk thick, stout, stuffed, then hollow, whitish or whitish-grey.

R. fœtens is a large, coarse species, common in woods, and easily recognised by its strong, penetrating, burning-fœtid odour, strongest in mature specimens in damp weather, and weakest in dry specimens in sunny weather. Acrid, probably poisonous.

108. **Russula emetica** Fr.—Pileus at first shining rosy, then shining blood-red, becoming lighter again when old, sometimes becoming white, yellowish, or buff—the crimson pellicle is separable, and the surface of the white flesh is red—at first campanulate, then flattened or depressed, margin sulcate and tuberculate; gills somewhat free, broad, rather distant, shining white; stalk spongy-stuffed, stout, elastic, even, white or clouded with rose-colour.

The whole plant is very brittle at maturity, and often mistaken for the smaller, acrid *R. fragilis*, in which, however, the gills are crowded. Found in woods and open places. Very acrid and poisonous; said to act as an emetic.

109. **Russula integra** Fr.—Pileus typically red, sometimes ranging in colour from red, through olivaceous, to brown, campanulato-convex, then expanded and depressed, pellicle viscous, at length tuberculate-sulcate at the margin, and brittle; flesh white, yellowish towards apex; gills somewhat free, broad, equal, or bifid near the stem, somewhat distant, connected by veins, at first pallid-white,

then powdered with ochraceous spores, rarely sterile and white; stalk clavate or ventricose, stout, spongy-stuffed, even, shining white.

A very common and variable inhabitant of woods, chiefly pine. Generally mild in taste, sometimes astringent.

GENUS X.—CANTHARELLUS Adans.

In *Cantharellus* the gills are thick, somewhat branched, obtuse at the edge, and fleshy-waxy; the spores are white; there is no annulus or veil. Most of the species are terrestrial; a few grow on mosses, and one or two grow on charcoal heaps or rotten wood. There are eighteen British species of *Cantharellus*, two of which are represented by models.

110. **Cantharellus cibarius** Fr. The Chantarelle.—Pileus fleshy, firm, smooth, convex, then plane or slightly depressed, at length repand; gills decurrent, very shallow and thick, distant; stalk solid, thickened upwards.

Fig. 42.—Cantharellus cibarius Fr. (One-third natural size.)

Frequent in woods, especially beech, where it grows in clusters, large rings, or scattered groups. It is easily recognised by its colour, which is orange-yellow in every part, within and without, and its pleasant odour, which has been compared with that of apricots or ripe greengages; the odour is, however, sometimes a little earthy and heavy. Esculent, and highly esteemed as a delicacy. Sold in the markets of Italy under the name of Gallinaccio (Turkey-cock) and in many French markets. Often dried and sold in strings. It requires four hours' cooking.

A very pale, almost white, variety of the Chantarelle is occasionally met with.

111. **Cantharellus aurantiacus** Fr.—Pileus fleshy, soft, often excentric, depressed, undulated, tomentose, at first involute at the margin; gills decurrent, crowded, repeatedly branched, often intense orange; stalk stuffed, at length hollow, somewhat unequal, ochraceous, sometimes becoming black. The pileus is light yellow and the gills white; a white variety occurs with cream-coloured gills.

C. aurantiacus is very common in woods, especially fir, often appearing in the winter; always puzzling to beginners, as the gills are often so thin as to suggest *Agaricus*. The whole plant is ochraceous and leathery-tough, and resembles a small, thin, attenuated variety of the Chantarelle. Said to be poisonous. Taste unpleasant.

GENUS XI.—MARASMIUS Fr.

The species of *Marasmius* closely resemble the Agarics of the sub-genus *Collybia*; they are, however, more tough and dry; they

shrivel in dry weather and revive with moisture, and so are much less putrescent than true Agarics. The stem is more cartilaginous or horny than the pileus; the gills are usually somewhat distant, with an acute edge. They grow on old stumps, twigs, dead leaves, etc.; some are terrestrial. The odour of new meal so common in Agarics is replaced in *Marasmius* by one of onions or garlic. Several of the species are highly fœtid. Most of them are small in size. There are forty-one British species of *Marasmius*; of these three only are represented by models.

112. **Marasmius porreus** Fr.—Pileus opaque dull yellow, paler when dry, thin but leathery, flaccid, convex, then flattened, obtuse, even on the disc, striate at the margin; flesh pallid; gills free, distant, somewhat thick, tough, broadly linear, at length leathery, light yellowish, becoming paler; stalk stuffed, then hollow, tough, juiceless, pubescent, somewhat thickened at both ends, red-brown, paler at the apex.

M. porreus is frequent in woods, especially among oak leaves; its strong odour of garlic is characteristic, but not peculiar, as two other species possess it. The odour passes away in drying.

113. **Marasmius oreades** Fr. The Fairy-ring Champignon.—Pileus at first pale livid buff in colour, with a darker disc, becoming paler when dry, hygrophanous, convex, then plane, somewhat umbonate, even, smooth, slightly striate at the margin when moist; gills free, very broad, distant, at first soft, then firmer, pallid-whitish; stalk solid, tough, stiff and straight, pallid, entirely naked, not hairy or distinctly downy.

Fig. 43. Marasmius oreades Fr. (One-half natural size.)

It grows in rings and groups during spring, summer, and autumn, in poor pastures, on lawns and downs, and by grassy roadsides. The odour is weak but agreeable, stronger when dried; taste mild. Esculent, delicious when fried in butter. It may be pickled, or dried for winter use; and a delicate, almost colourless ketchup can be made from it.

114. **Marasmius rotula** Fr.—Pileus whitish, or with a small brownish umbilicus, membranaceous, dry, convex, plicate at margin; gills few, distant, white; stalk horny, hollow, equal, shining deep brown or blackish, striate when dry.

M. rotula is frequent; it is small in size and grows gregariously on dead twigs in woods and by hedgesides; it may be known by the peculiar attachment of the gills to a collar which encircles, but does not touch, the top of the stem.

GENUS XII.—LENTINUS Fr.

In *Lentinus* the species are distinctly cartilaginous-leathery, generally irregular in growth, with the gills minutely toothed or torn at the edge, sometimes requiring a lens to detect the serration. The British species grow on stumps and trunks, and, though not brightly coloured plants, are attractive and often beautiful. There are eleven British species of *Lentinus*, only one of which is represented by a model.

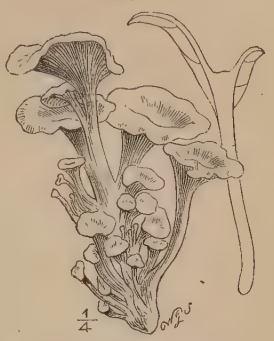


Fig. 44.—Lentinus cochleatus Fr. (One-quarter natural size.)

115. **Lentinus tigrinus** Fr.—Pileus creamy-whitish, variegated with blackish, hairy squamules, fleshy-leathery, thin, convexo-plane, umbilicate, at length infundibuliform, often split at the margin when dry; gills decurrent, narrow, crowded, unequal, toothed, white; stalk thin, solid, hard, attenuated downwards, squamulose, creamy-white, fuscous at the base, furnished at the apex with an entire, reflexed, fugacious ring.

L. tigrinus is rare and grows upon stumps, old trunks, and branches in a gregarious or cæspitose manner. Acrid, odour strong.

ORDER II.—POLYPOREÆ.

In the *Polyporeæ* the under surface of the pileus is covered with small, closely packed tubes. The tubes are lined with cells named basidia, bearing spores in groups of four in the same manner as in the *Agaricineæ* (see fig. 1, page 7). The species are fleshy, leathery, or woody. There are 211 British species, nineteen of which are represented by models.

GENUS XIII.—BOLETUS Dill.

In *Boletus* the spongy mass of small, vertical, closely packed tubes is easily separated from the under surface of the pileus. All the species have central stems, and are fleshy and putrescent. They are terrestrial, and many are esculent. In the edible species the tubes should be scraped away before cooking. There are forty-nine British species of *Boletus*, thirteen of which are represented by models.

116. **Boletus luteus** Fr.—Pileus yellowish, smeared with a separable brown glutinous covering, gibbous, then pulvinate; flesh white; tubes adnate; pores minute, simple, yellow; stalk equal, firm, whitish, rough with dots above the large, membranaceous, white-brown ring.

B. luteus is very common in pine woods from late summer to early winter. Edible and highly esteemed.

117. **Boletus granulatus** L.—Pileus yellowish, smeared with a thick, reddish-brown glutinous covering, convexo-expanded; flesh light yellowish; tubes adnate, short; stalk ringless, light yellowish, often attenuated, and dotted above with granules.

B. granulatus grows in fir woods, often gregariously, and is easily recognised by the minute sugary granules at the mouths of the pores produced by the drying of the milky fluid. Said to be edible.

118. **Boletus bovinus** L.—Pileus yellowish or reddish-buff, with a thin, non-separating glutinous covering of the same colour; flesh white; tubes shallow, somewhat decurrent; pores compound, greyish-yellow or greenish, becoming brown; stalk equal, even, of the same colour as the pileus.

B. bovinus grows locally in woods, chiefly pine; it is generally gregarious.

119. **Boletus sanguineus** With.—Pileus viscid, becoming crimson-brown and convexo-plane with age; flesh white, slightly tinged with crimson next the skin, and slowly changing to bluish when cut or broken; tubes adnate, orange-yellow; pores large, unequal; stalk equal, even, bright yellow splashed with crimson.

In woods, not common.

120. **Boletus piperatus** Bull.—Pileus yellow or orange-ochre, sometimes pale, convexo-plane, smooth, slightly viscid; tubes decurrent, bright ferruginous-red, almost vermilion; pores large, angular; stalk slender, even, fragile, same colour as the pileus, containing yellow milk at the base.

B. piperatus is frequent in woods, and very different in appearance from the other British species; it is generally small. Acrid, poisonous.

121. **Boletus variegatus** Sw.—Pileus rich yellow, hairy-squamulose, convex, then plane, slightly moist, sprinkled with superficial, separating, fasciculate, hairy squamules; flesh yellow, changing in places to azure-blue on being cut or broken; tubes adnate, unequal; pores minute, brown, then cinnamon; stalk firm, equal, even, deep yellow or reddish.

B. variegatus grows chiefly in pine woods. Odour unpleasant; taste mild.

122. **Boletus subtomentosus** L.—Pileus brown, sometimes tending to olivaceous, soft, dry, velvety, pulvinato-expanded, often fissured, and when cracked the interstices becoming yellow; flesh white, pallid, brownish beneath the cuticle; tubes adnate; pores large,

angular, yellow ; stalk short, attenuated downwards, faintly ribbed, slightly rough.

Common in mixed woods, but especially beech, where it frequently grows on beech nuts.

123. **Boletus pachypus** Fr.—Pileus brownish-ochre, then tan-coloured, pulvinate, slightly velvety ; flesh whitish or pale yellowish, changing to azure-blue on being cut or broken ; tubes long, shortened round the stem ; pores round, yellow, at length greenish ; stalk thick, firm, somewhat short, ovato-bulbous, reticulate, variegated yellow and red, sometimes wholly blood-red.

B. pachypus is a large and beautiful species, common in mixed woods.

124. **Boletus edulis** Bull.—Pileus light brown, bay, or chestnut, rarely whitish or grey-brown, pulvinate, smooth, moist ; flesh white, unchanging when cut or broken, compact, brownish beneath the cuticle ; tubes almost free, elongated, minute, at first white, then yellow-green, at length olive-greenish, very short round the stem ; stalk stout, often swollen, pale brown, reticulated with fine white network at apex (best seen under a lens).

Fig. 45.—Boletus edulis Bull. (One-quarter natural size.)

B. edulis is very common in woods, especially beech, from midsummer to early winter, and easily distinguished from the other British species. Usually large and obese. Esculent ; one of the best, but the flesh is somewhat soft and tasteless when cooked. When cooked with meat or in gravy it is excellent. It is in the best condition for cooking when the tube surface is yellowish. This is the common edible *Boletus* of Continental markets, where it is sometimes sold under the name Cépe or Ceps. It is the Porcino (pig) or Ferré of Italian markets.

A brilliant yellow parasitic mould often attacks the tubes of *B. edulis*, *B. subtomentosus*, and *B. scaber* ; this is named *Hypomyces chrysospermus* Tul.

125. **Boletus Satanas** Lenz.—Pileus pale brownish-tan, becoming nearly white, pulvinate, smooth, somewhat viscous ; flesh whitish, often with bright-crimson patches at the base of the stem, becoming bright blue when bruised or broken ; tubes free, yellow ; pores minute, at first blood-scarlet, becoming vermilion or orange when old ; stalk very stout, ventricose, beautifully marked at apex with blood-red reticulations.

B. Satanas is a rare, often large, and handsome inhabitant of woods and woody places. Said to be dangerous, but probably harmless. Taste mild.

126. **Boletus luridus** Schæff.—Pileus dark brown, tomentose, at length somewhat viscous, pulvinate; flesh yellow, often red at the base of the stem, quickly changing to dark blue on being cut or broken; tubes free, yellow, at length green; pores round, dull scarlet, becoming dull scarlet-orange; stalk somewhat long, stout, frequently enlarged below, orange-red or orange-brown, commonly rough with dots or coarse reticulations.

B. luridus is an ally of *B. Satanas*, very common in woods and woody places. Taste not unpleasant. Said to be poisonous, but sold as an esculent in the markets of Prague under the name Kowar, and frequently eaten in Vienna under the name Schuster.

127. **Boletus versipellis** Fr.—Pileus constantly rufous, pulvinate, dry, at first compact and velvety, then scaly and even, with fragments of the annular, membranaceous veil; tubes free, plane, minute, dingy white; pores grey; stalk solid, attenuated upwards, wrinkled-scaly.

A common fungus in woods, woody places, and on heaths.

128. **Boletus scaber** Fr.—Pileus pulvinate, smooth, viscid when moist, brown, varying orange or red, rarely black or white, rugulose or rivulose, margin at first cortinate; tubes free, convex, white, then dingy; pores white, minute, round—the whole plant generally changes to a slaty-brown hue on being cut or broken; stalk solid, long, attenuated upwards, rough and granular with dark particles.

Generally large in size, easily recognised, and one of the commonest inhabitants of woods from summer till early winter.

Edible. This is the Porcinello (little pig) or Albarello of Italian markets.

The orange-red variety is often confounded with *B. versipellis*, which has a constantly rufous, dry, and tomentose pileus.

GENUS XIV.—FISTULINA Bull.

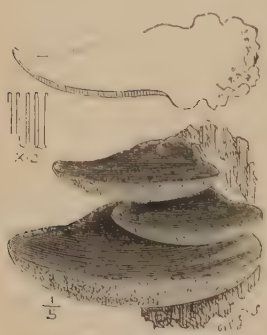


Fig. 46.—Fistulina hepatica Fr. (One-fifth natural size.)

There is but a single British species of *Fistulina*. It is distinguished from *Polyporus* by the tubes being slightly distinct from each other and not longitudinally adpressed and conjoined.

129. **Fistulina hepatica** Fr. Beefsteak Fungus.—Pileus dark crimson-brown, resembling liver; flesh thick, roundish, dimidiate, tongue-shaped, juicy, traversed by tenacious fibres, variegated flesh-colour and crimson, slicing like beef-steak; tubes convex, distilling a pellucid juice, at first pallid, then flesh-coloured or ochraceous-carnation.

F. hepatica is common on living oaks, less so on the trunks of the willow, beech, walnut, chestnut, and ash. Imbricated and

attaining an enormous size and weight, sometimes nearly 30 lb. It grows with rapidity when the weather is favourable, and may reach its full size in a fortnight. Unlike *Polyporus*, *Fistulina* perishes in about three weeks from the time of its first appearance. Esculent and said to be nourishing, but very tough when young and with a somewhat acid flavour not pleasant to all tastes. It is not fit for the table till it is quite ripe, when it is most tender.

Fistulina may be minced, soaked in boiling vinegar, and served with minced veal and lemon.

GENUS XV.—POLYPORUS Fr.

In *Polyporus* the tubes are connate with the substance of the pileus; they do not readily peel away, as in *Boletus*, nor are they separate from one another, as in *Fistulina*. Most of the species grow on stumps and trunks, a few on the ground; they are generally persistent and often perennial, adding new zones of growth. There are 126 British species of *Polyporus*; four only of these are represented by models.

Fig. 47.—Polyporus squamosus Fr. (One-seventh natural size.)

130. **Polyporus lucidus** Fr.—Pileus corky or woody, usually kidney-shaped and broadly furrowed; tubes long, minute, white, at length whitish-brown; stalk hard, lateral, usually long and irregular in form, lustrous and of the same colour as the pileus.

Frequent on rotting stumps, and known from every other British species of *Polyporus* by its shining-brilliant crimson-chestnut pileus and stalk.

This fungus has been found preserved in peaty beds in the fens of the eastern counties; it also occurs, with *P. igniarius*, *P. fomentarius*, and *Dædalea quercina*, in the lake-side pile-dwellings of Switzerland and Italy.

131. **Polyporus sulphureus** Bull.—Pileus juicy-cheesy, fleshy, undulated, somewhat smooth; flesh light sulphur-colour, often splitting, when mature and vigorous containing sulphur-yellow milk; pores minute, plane, sulphur-yellow; usually stemless.

P. sulphureus, a beautiful and easily recognised species, grows, often cæspitose, on living trees and stumps; it is frequent on old yews. A well-marked characteristic is its distinct sulphur-colour, sometimes spotted with saffron-red. This species is sometimes luminous.

132. **Polyporus cæsius** Fr.—Pileus fleshy, unequal, silky; tubes very small, unequal, long; pores torn into teeth. The tubes change

colour to a faint bluish-grey on being bruised, and by this character it may be easily recognised.

P. cæsius is a common fungus on dead firs, sometimes on rotten stem fragments. The whole plant is ivory-white, softish-tough, and stalkless.

133. **Polyporus betulinus** Fr.—Pileus white, then brownish, fleshy, corky, hoof-shaped, zoneless, edge obtuse, pellicle thin, cracking, and sometimes separating; tubes short, minute, whitish, at length separating.

Common on living and dead trunks and branches of birch from spring to early winter. This is the razor-strop fungus. Thick slices of flesh cut from large examples are used as razor strops.

The mycelium of this fungus sometimes forms sheets like hard leather beneath the bark of birches, and, without producing pilei, destroys the firmest wood. This leathery mycelium has been described under the name of *Xylostroma giganteum*.

GENUS XVI.—MERULIUS Fr.

In *Merulius* the whole plant is at first resupinate, and the hymenium is reticulated with obtuse folds, becoming gyrose and imperfectly toothed, developed from a soft mucedinous substratum. There are twelve British species; one only is represented by a model.

134. **Merulius lacrymans** Fr. Dry-rot.—The substance, when in full vigour, fleshy, moist, and pale buff in colour, with a swollen, white, downy margin; the spore-producing portion, or hymenium, consists of shallow, labyrinthine, gyrose, toothed folds, rich orange-cinnamon in colour; when mature and in vigorous growth, drops of watery fluid are exuded from the hymenium.

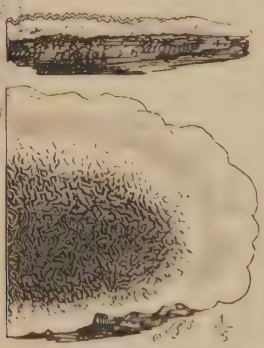


Fig. 48.—Merulius lacrymans Fr. (One-third natural size.)

Dry-rot is common in buildings, particularly in hidden, unventilated spaces, on squared wood, especially pine, but spreading to other woods, and over plaster, mortar, and other substances, where it perfects itself. Not common on squared timber out of doors, and on fallen pines. This fungus does not grow naturally on teak, but it will spread from pine to teak and destroy it. Wooden ships were in past times extensively destroyed by it. During the reign of Charles II. a commission was formed to inquire into the state of the navy, and Pepys, who was secretary to the Admiralty, tells of thirty new ships that for want of proper care and attention had toadstools growing in their

holds as big as his fists, and were in so complete a state of decay that some of the planks had dropped from their places.

A writer in the *European Magazine* for 1811 describes a ship attacked by dry-rot at Woolwich, which was in so bad a state that the decks sunk under a man's weight, and the orange- and brown-coloured fungus was hanging in the shape of inverted cones from deck to deck. The dry-rot of oak-built vessels is *Polyporus hybridus* B. & Br.

ORDER III.—HYDNEÆ.

In the *Hydneæ* the gills of the *Agaricineæ* and the tubes of the *Polyporeæ* are represented by spines, teeth, tubercles, crests, or papillæ.

GENUS XVII.—HYDNUM L.

Spines awl-shaped. There are forty-eight British species, two only of which are represented by models.

135. **Hydnum imbricatum** L.—Pileus generally depressed, rich, dark, rufescent brown, sometimes plane but generally broken up into coarse, floccose patches; flesh firm, hard, grey-white or brownish-white; spines long, decurrent, greyish or brownish-white; stalk short, even, often attenuated towards base.

A large plant found in pine woods, rare but sometimes locally abundant. Said to be edible; but tough, bitter, and disagreeable.

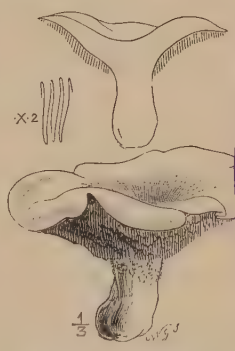


Fig. 49. -Hydnum repandum L. (One-third natural size.)

136. **Hydnum repandum** L.—Pileus fleshy, lobed and repand, smooth; spines long, unequal; stalk central or nearly so, irregular.

Common in mixed woods, where it grows singly, or in clusters or rings; the colour of the entire plant is buff-white or ochraceous-white. Esculent; requires four hours' slow stewing. Has been eaten raw in very thin slices with sandwiches.

BOOKS NEVER SOLD
HILDYARD
ST NICHOLAS CLUB

ORDER IV.—THELEPHOREÆ.

In the *Thelephoreæ* there are neither gills, tubes, nor spines; the hymenium is even, rarely ribbed, or spuriously papillose. All the species are either waxy or coriaceous.

GENUS XVIII.—CRATERELLUS Fr.

All the species are terrestrial, stipitate, furnished with a pileus; hymenium waxy-membranaceous, continuous with the stem,

even or slightly and irregularly veined. There are five British species; one only is represented by a model.

Fig. 50.—Craterellus lutescens Fr. (One-half natural size.)

137. **Craterellus crispus** Fr.—Pileus fuliginous, becoming fuscous, fleshy-membranaceous, tubæform or infundibuliform, crisped; stalk stuffed at base, pallid; hymenium even, pallid.

Common in mixed woods. Strong musky smell.

GENUS XIX.—THELEPHORA Ehrh.

The species of *Thelephora* are varied in form, being pileate, clavate, or resupinate; the hymenium even or ribbed. Nearly all the species are terrestrial, but a few grow on stumps, twigs, dead acorns, etc. There are seventeen British species: two of these are represented by models.

Fig. 51.—Thelephora laciniata Pers. (One-third natural size.)

138. **Thelephora Sowerbeii** B. & Br.—Pileus leathery, entire, infundibuliform, rough with radiating processes projecting from the surface, white, at length dull yellowish; hymenium smooth.

Rare, terrestrial.

139. **Thelephora laciniata** Pers.—Pileus thin, imbricated, fibrous-scaly, ridged; margin fibrous, fringed, at first whitish; hymenium papillose, flocculose.

Common in woods, chiefly fir, often growing on fir stumps or on masses of fir leaves. Perennial; whole plant rich dark brown and leathery-soft.

GENUS XX.—STEREUM Fr.

In *Stereum* the species are woody, mostly perennial, somewhat zoned, entire; pileus fibrous-coated; hymenium inferior, leathery. There are sixteen British species; two are represented by models.

140. **Stereum hirsutum** Fr.—Pileus covered with short, stiff, yellowish-pallid or grey hairs; margin yellow; hymenium even, smooth, and yellowish; whole plant thin, leathery, stiff, whitish-ochre or yellow-buff in colour, but varying through yellowish greys and browns.

Common on stumps, readily found at all seasons of the year.

A deep rose-red stain is frequent on this fungus, caused by a parasitic mould named *Hypomyces rosellus* Tul.

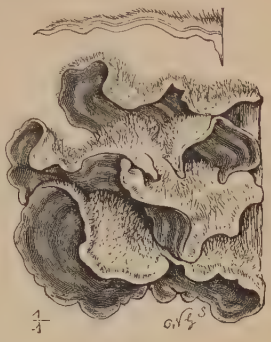


Fig. 52.—Stereum hirsutum Fr. (Natural size.)

141. **Stereum tabacinum** Fr.—Pileus rich dark rusty brown, with a yellow margin, leathery and thin; hymenium paler and varying in tint.

Somewhat uncommon, found on fallen branches in woods.

GENUS XXI.—AURICULARIA Fr.

The species of *Auricularia* are gelatinous and tremulous when moist, leathery when dry; hymenium inferior, remotely and irregularly costato-plicate. There are two British species; one is represented by a model.

Fig. 53.—Auricularia mesenterica Fr. (One-third natural size.)

142. **Auricularia mesenterica** Fr.—Pilei lobed and twisted, fuscous-cinereous, zoned with browns, dull purples, and livid hues, hairy; hymenium coarsely veined, livid or fuscous-violaceous, powdered with a bloom. The whole plant is gelatinous; in wet weather, cartilaginous; and the leathery condition assumed in dry weather disappears with moisture.

Frequent on stumps and old branches; it sometimes forms a large mass.

ORDER V.—CLAVARIEÆ.

The *Clavarieæ* are usually vertical, club-like, simple or branched, fleshy, never leathery.

GENUS XXII.—CLAVARIA L.

The species are usually small, vertical, club-like, simple or branched, generally terrestrial and usually white or yellow. There are forty-five British species, of which ten are represented by models.

It is said that all the large species of *Clavaria*, whether white or yellow, are sold indiscriminately in the markets of France as articles of food.

143. **Clavaria botrytis** Pers.—White, yellowish, or flesh-coloured, fragile; trunk thick, unequal, much branched; branches swollen, unequal, somewhat wrinkled, reddish at apices.

Rare, in woods, sometimes growing about beech stumps.

144. **Clavaria coralloides** L.—White, cæspitose, somewhat fragile, hollow within; trunk rather thick, repeatedly and irregularly

Fig. 54.—Clavaria cinerea Bull. (One-third natural size.)

Fig. 55.—Clavaria vermicularis Fr. (One-half natural size.)

branched; branches unequal, dilated upwards; branchlets crowded, acute.

Rare in shady woods. Edible. Sold in the markets of Italy.

145. **Clavaria stricta** Pers.—Yellowish-pallid, fuscous when bruised; trunk thick, much branched; branches and branchlets stiff, straight, even, adpressed, crowded, acute.

C. stricta grows in woods on and about stumps; uncommon.

146. **Clavaria fusiformis** Sow.—Known from all other British species of *Clavaria* by the toothed or pointed fuscous apex of each generally simple, yellow club; trunks connate, slightly firm, even, soon hollow, and attenuated at the base.

A common plant in woods and pastures.

147. **Clavaria inæqualis** O. F. Müll.—Yellow, gregarious, somewhat fasciculate, compressed or channelled; trunks variable, simple or forked, sometimes jagged at the apex and ventricose in centre; tufts much less dense than in *C. fusiformis*.

Common in woods and pastures.

148. **Clavaria fragilis** Holmsk.—Trunks club-shaped, white or yellowish, fasciculate, very fragile, attenuated downwards, hollow, somewhat obtuse, simple, rarely forked, often compressed, twisted, and wrinkled; base white.

Common in pastures, by grassy roadsides, etc.

149. **Clavaria pistillaris** L.—Light yellow or buff, then brownish, fleshy, stuffed, obovato-clavate, obtuse.

The stoutest of the British species, resembling an obese club; not uncommon in woods, grassy lanes, etc.

150. **Clavaria Ardenia** Sow.—Buff-brown in colour, simple, eight or more inches long, hollow, thickened upwards, acute, then obtuse, often depressed at the apex when fully grown, tomentose at base, not rooting.

Very rare. It grows upon the ground, on fallen branches, fir leaves, etc.

151. **Clavaria tuberosa** Sow.—Yellowish, springing from a thick, strigose, sub-globose tuber, producing two or three simple, linear, tough, sub-acute clubs from the same base.

C. tuberosa grows on birch, and is very rare.

152. **Clavaria acuta** Sow.—White, simple, cylindrical, stiff, straight, sharp-pointed, pruinose.

On soil in garden pots. Rare.

GENUS XXIII.—TYPHULA Fr.

The species of *Typhula* resemble tender, hair-like species of *Clavaria*. All except one, which is terrestrial, grow on twigs, leaves, straw, moss, etc. There are ten British species. Five of these spring from a small hard mass of compact mycelium termed a *sclerotium*.

153. **Typhula phacorrhiza** Fr.—Stems or threads pallid, becoming somewhat fuscous below, simple, elongated, filiform, smooth, downy at the base. The hardened mycelium from which it springs has been named *Sclerotium scutellatum*.

In woods and hedges, on dead herbaceous stems, leaves, etc.; uncommon, but sometimes found in considerable abundance in patches. It may spring direct from the sclerotium buried in the ground.

Fig. 56.—Typhula phacorrhiza Fr. (One-half natural size.)

154. **Typhula gracilis** Berk. & Desm.—Club pallid, simple or forked, acute, rough with spores and little prominent bristles; stalk distinct from club, smooth or bristly.

Very small, growing on decaying leaves. Uncommon.

ORDER VI.—TREMELLINEÆ.

The *Tremellineæ* are homogeneous, gelatinous, shrivelling when dry, reviving when moistened.

GENUS XXIV.—TREMELLA Fr.

The species of *Tremella* are jelly-like when moist, tremulous, and immarginate, not papillate.

155. **Tremella frondosa** Fr.—Very large, cæspitose, even, plicate at base; lobes gyroso-undulate, semi-transparent, pinkish-yellow or yellowish.

Rare on the roots of living trees, oak, etc.

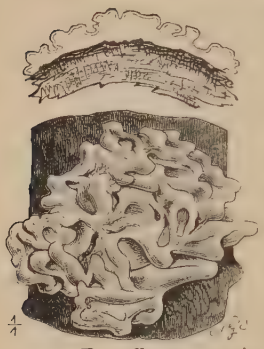


Fig. 57.—Tremella mesenterica Retz. (Natural size.)

156. **Tremella mesenterica** Retz. Witches' Butter.—Flesh somewhat tough, and the surface simple, plicato-undulate, and gyrose; when full grown pulverulent with the spores.

Very common on dead sticks of furze, broom, etc., and known from the other British species by its brilliant shining-orange colour. It sometimes appears in the winter.

157. **Tremella moriformis** Berk.—Small in size, gelatinous, firm, spherical, sinuous, and opaque. The interior mass is translucent violet.

It grows on dead branches, and is rare. It is known by its mulberry colour.

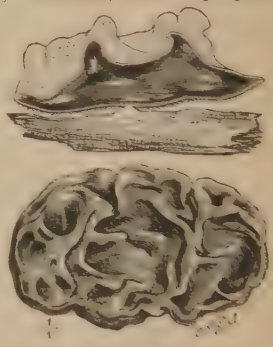


Fig. 158.—Exidia glandulosa Fr. (Natural size.)

GENUS XXV.—EXIDIA Fr.

Jelly-like when moist, tremulous, somewhat marginate, papillose. There are four British species, one of which is represented by a model.

158. **Exidia recisa** Fr.—Brownish-yellow, very soft; disc truncato-plane, ribbed, papillose, rough with dots beneath; attachment excentric, oblique.

Common on dead wood, willow, etc.

Fig. 59.—Hirneola Auricula-Judæ Berk. (One-third natural size.)

GENUS XXVI.—HIRNEOLA Fr.

Gelatinous, inclining to cartilaginous, when dry leathery-horny, cup-shaped, reviving when moistened. There is only one British species.

159. **Hirneola Auricula-Judæ** Berk. Jew's Ear.—Cinereous-olive or brownish flesh-coloured, at length black, thin, concave, flexuous, somewhat like a human ear, veined and folded without and within, tomentose on the under surface.

Local on old trunks, especially elder and elm.

SUB-CLASS II.—GASTEROMYCETES.

In the *Gasteromycetes*, of which the puff-balls are good examples, the plants are at first globular; the hymenium is internal, and the spores are borne in fours on the basidia, as in the *Hymenomycetes*, and only become free when the fungus is ripe.

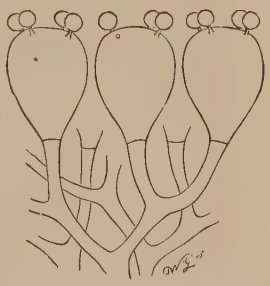


Fig. 60. — Spores on basidia from Lycoperdon giganteum Batsch. (Enlarged 500 diameters.)

ORDER VII.—PHALLOIDEÆ.

In their early condition the *Phalloideæ* are globular and puff-ball-like; there is a gelatinous stratum immediately beneath the outer membrane, and the hymenium is deliquescent. There are three British genera and four species; three species are represented by models.

GENUS XXVII.—PHALLUS Mich.

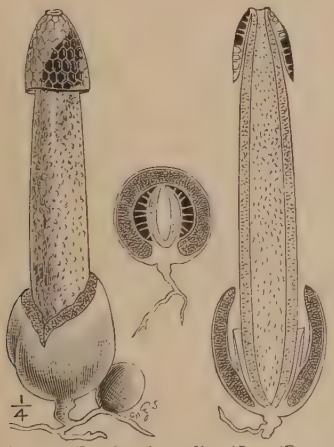


Fig. 61.—Phallus impudicus L. (One-quarter natural size.)

In *Phallus* the pileus is perforated at the apex, free all round, and reticulate. There is a single British species.

160. **Phallus impudicus** L. Stinkhorn; is sometimes called wood-witch or hedge-witch.—Pileus conical, perforated, reticulated, white, when young filled with a deliquescing olive-black mucous mass; stalk naked, elongated, hollow, honeycombed; volva pale buff-brown, containing pale olive-yellowish jelly.

Very fœtid; common in gardens, shrubberies, woods, hedges, plantations, etc.; generally among rotten tree-roots, stumps, and branches.

GENUS XXVIII.—MUTINUS Fr.

In *Mutinus* the pileus is adnate and imperforate, uneven. The species represented by the model is a native of Britain; a Javan species has been observed in a plant nursery in England.

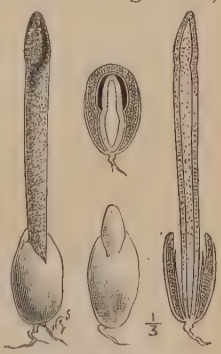


Fig. 62.—Mutinus caninus Fr. (One-third natural size.)

161. **Mutinus caninus** Fr.—Pileus continuous with the stem, wrinkled, imperforate, crimson, covered when young with olive-brown

scentless mucus; stalk hollow, white, faintly tinted with ochre, or orange; volva pale buff-brown.

Uncommon, growing among decayed leaves in woods and hedges.

GENUS XXIX.—CLATHRUS Mich.

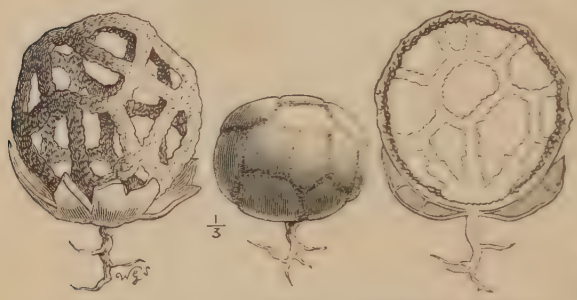


Fig. 63.—Clathrus cancellatus Tourn. (One-third natural size.)

Volva becoming torn at the apex in a laciniate manner; receptacle sessile, forming an obovate or globular hollow network, at first covered with mucus containing the spores. There is only one British species.

162. **Clathrus cancellatus** Tourn.—Receptacle vermilion or bright orange red, covered when young with olive mucus; spores cylindrical, colourless. Odour very fœtid.

On the ground, in gardens and woods.

ORDER VIII.—LYCOPERDACEÆ.

In the *Lycoperdaceæ* the peridium is double, and the hymenium at length dries up into a dusty mass of threads (*capillitium*) and spores. There are five British genera, of which four are represented by models.

GENUS XXX.—BATARREA Pers.

In *Batarrea* the volva is universal, central stratum gelatinous, and the receptacle pileiform, bursting through the volva, elevated at the top of a tall stalk.

163. **Batarrea phalloides** Pers.—Receptacle on top of stalk, forming a pileus, covered with a brown, dusty mass of spores; stalk long, straight and firm, hollow, but filled with thin mucilage, exterior coarsely fibrous-scaly; volva pale buff-brown, torn, containing jelly.

B. phalloides is very rare; it has been found in old hollow trees and on sandhills, sometimes in the winter. The fungus springs from a volva like *Phallus* and *Mutinus*.

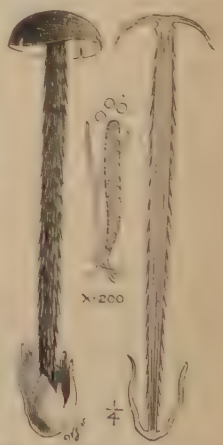


Fig. 64.—Batarrea phalloides Pers. (One-quarter natural size.) Paraphyses and spores × 200.

GENUS XXXI.—GEASTER Mich.

In *Geaster* the peridium is double, the outer one distinct, persistent, bursting and dividing into several stellate lobes. The Geasters are popularly termed earth-stars or starry puff-balls. There are twelve British species; three of these are represented by models.

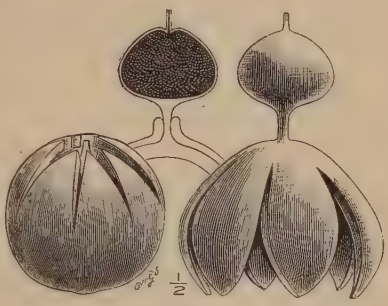


Fig. 65.—Geaster limbatus Fr. (One-half natural size.)

164. **Geaster coliformis** Pers.—Known from the other British species by its numerous ciliated apertures and the slender supports of the inner peridium; outer peridium multifid, expanded.

A rare species, found in sandy places.

165. **Geaster limbatus** Fr.—Outer peridium leathery, expanded, and multifid, while the inner is supported on a single, distinct stalk, and the fimbriato-pilose mouth is elongated and acute, with a slight depression at the base.

One of the less common British species, found on the ground among leaves.

166. **Geaster mammosus** Chev.—Outer peridium multipartite, rigid, hygrometric; laciniæ equal; inner peridium unstalked; mouth ciliate, acutely conical, surrounded by a circular disc.

The rarest and smallest of the British species; on the ground.

GENUS XXXII.—BOVISTA Dill.

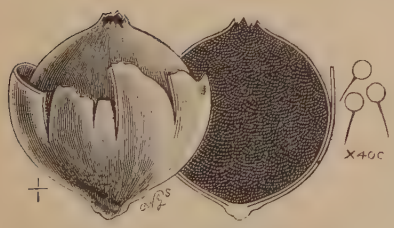


Fig. 66.—Bovista plumbea Pers. (Natural size.) Spores × 400.

In *Bovista* the peridium is papyraceous, or sometimes corky, persistent; bark distinct, continuous, at length shelling off; capillitium sub-compact, equal, adnate to the peridium on all sides. There are four British species; one only of these is represented by a model.

167. **Bovista plumbea** Pers.—Peridium papery, flexible, lead-coloured; bark sub-persistent at base; mouth narrow; capillitium and spores brown.

Small, and common in pastures and on downs.

Dr. Bull describes it as well-flavoured, rich, and good when young.

B. plumbea commonly grows in company with *Agaricus campestris*, and is sometimes taken by mushroom gatherers, from its resemblance to button mushrooms.

GENUS XXXIII.—LYCOPERDON Tourn.

In *Lycoperdon* the peridium is membranaceous, disappearing above, or becoming flaccid; outer peridium adnate, sub-persistent, breaking up into scales or warts; capillitium soft, dense, adnate to the peridium and spongy base. There are eleven British species, three of which are represented by models.

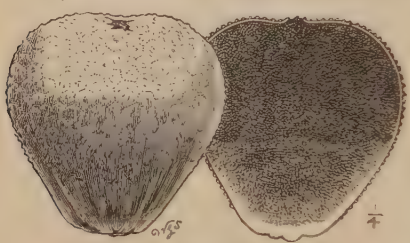


Fig. 67.—Lycoperdon cælatum Fr. (One-quarter natural size.)

168. **Lycoperdon giganteum** Batsch. Giant Puff-ball.—Peridium very fragile above and obtuse, cracking, evanescent, widely open, white, sometimes very faintly shaded with buff or ochre, soft and smooth like kid leather; outer peridium floccose, rather distinct; capillitium vanishing together with the dingy-olive spores; stalkless.

Found in rich pastures, orchards, and grassy places; very abundant in some localities. Sometimes it grows in rings 30 ft. to 50 ft. in diameter. Edible when young, when the flesh is firm and perfectly white; it must be rejected if the flesh is tinted with yellow.

It is distinguished from the other British species of puff-ball by its large size; it is usually about nine inches in diameter, but often much larger. Prof. Bessey, in the *American Naturalist* for May 1884, records an oval specimen found in Herkimer County, N.Y., measuring 5 ft. 4 in. in its greatest diameter by 4 ft. 6 in. in its least, though its height was only 9½ in. An example was sent to the *Gardeners' Chronicle* office in 1884 for a name which measured 5 ft. 4 in. in circumference. A specimen was exhibited at the Edinburgh Fungus Show, in October 1878, which was 4 ft. 6 in. in circumference and weighed 20 lb.

169. **Lycoperdon cælatum** Fr.—Peridium flaccid above, falling in or collapsing, obtuse, dehiscent at apex, at length open, cup-shaped; inner peridium distinct all round; capillitium nearly free, collapsing; spores dingy-olive; base stalk-like, blunt, spongy, obconical.

L. cælatum is common in pastures and is large, though smaller than *L. giganteum*. Odour disagreeable, musty, mouse-like.

170. **Lycoperdon gemmatum** Fr.—Globular with a narrow base, not smooth like *Bovista plumbea* but scurfy or covered with sub-spinulose warts, white or ochrey-white, opening at maturity with a slightly umbonate mouth; peridium membranaceous, persistent; flocci in centre forming a columella, persistent; spores greenish-yellow.

This small species is common on downs and in pastures.

Some of the small species of *Lycoperdon* are dangerous if eaten in a raw state; rapid inflammation of the throat and a greatly swollen tongue and neck have been known to ensue. This is probably true also of *Bovista*.

ORDER IX.—SCLERODERMEÆ.

GENUS XXXIV.—SCLERODERMA Pers.

In *Scleroderma* the peridium is firm, warty, bursting irregularly at the apex; flocci adhering on all sides to the peridium, and forming distinct veins in the central mass. There are four British species; two of these are represented by models.

Fig. 68.—Scleroderma vulgare Fr. (One-half natural size.) Basidium with spores × 200.

171. **Scleroderma vulgare** Fr.—Exterior is pale brownish-yellow, flecked with darker squarrose scales; the interior is intensely blue-black, speckled with white.

S. vulgare is common on open places in woods; it is partly immersed in the soil. Odour strong, rank, and disagreeable. It can scarcely be termed edible, yet it has often been eaten, sometimes with the mistaken idea that it is a truffle. It is frequently used for the adulteration of *pâté de foie gras*. In its young state it has been named Vegetable Tripe, and is perhaps harmless.

Sometimes this fungus is attacked by a parasite larger than itself in *Boletus parasiticus* Bull., and this in turn may be attacked by *Hypomyces luteo-virens* Tul.

172. **Scleroderma verrucosum** Pers.—Stalk short, thick, lacunose; peridium sub-verrucose, thin above, and fragile; inner mass purplish-black; flocci and spores brown.

S. verrucosum grows on sandy ground.

GENUS XXXV.—POLYSACCUM DC.

In *Polysaccum* the common peridium is simple, rigid, bursting irregularly; internal mass divided into distinct cells filled with peridiola; spores mixed with the threads.

173. **Polysaccum olivaceum** Fr.—Peridium smooth or somewhat tuberculose, roundish, reddish-brown-olive, dehiscing irregularly; filled with cavities with rigid walls; peridiola irregular, angular, yellow; stalk short, abrupt. Very rare; sandy places.

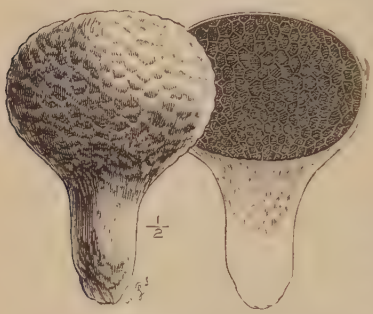


Fig. 69.—Polysaccum olivaceum Fr. (One-half natural size.)

ORDER X.
HYMENOGASTREÆ.

Subterranean fungi, differing from the true truffles in the spores being borne on basidia, and not enclosed in asci. There are seven British genera and twenty species of *Hymenogastreæ*; of these only one species is represented by a model.

GENUS XXXVI.—MELANOGASTER Corda.

The peridium has no distinct base; it contains hymenial chambers filled with spores, which are smooth.

174. **Melanogaster variegatus** Tul.—The exterior is yellowish or ferruginous and finely granular; the interior is soft, intensely blue-black, marbled with yellow.

M. variegatus usually grows gregariously two or three inches beneath the surface; at other times it is partly exposed, and only covered by leaves and twigs. Under beeches, poplars, etc.

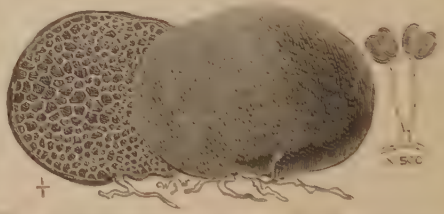


Fig. 70.—Melanogaster variegatus Tul. (Natural size.) Basidium with spores × 500.

The odour is strong, aromatic, agreeable, and not unlike that of bitter almonds; when cooked, the taste is sweet and approved by many. Formerly this fungus was commonly sold in the markets of Bath under the name of the "Red Truffle," but of late years nothing has been seen of it in the shops or on the stalls. This species is eaten on the Continent.

Var. *Broomeianus* Berk.—Slightly differs from the type in the marbling being at first pale, then red, sometimes permanently pale, but never bright yellow. Externally reddish-ochre, becoming less bright; internally white, then pale yellow, at length smoky.

The variety is scentless when young, but soon acquires a sweet treacly odour, or an odour of decaying pears, less powerful than the scent belonging to the type. Under beeches and Lombardy poplars.

CLASS II.—ASCOMYCETES.

SUB-CLASS I.—DISCOMYCETES.

In the *Discomycetes* the spores are not naked, as in the *Basidiomycetes*, but are produced in series of eight, within cylindrical or club-shaped asci (Fig. 71). At maturity the asci open at the apex, sometimes with a minute lid or operculum, and set the spores free, as at A. Growing among the asci are slender bodies, as at B, termed paraphyses. The surface of the asci is more or less exposed, and not immersed in the inner substance of the fungus, as in the *Gasteromycetes*. In the *Discomycetes* the pileus or receptacle is cupulate, applanate, or mitrate, stipitate, sessile, or immersed; substance fleshy, waxy, gelatinous or rarely cartilaginous.

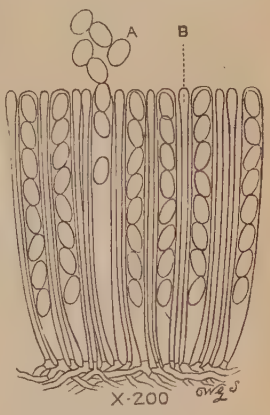


Fig. 71.—Asci with spores of Morchella esculenta L. (Enlarged 200 diameters.)

GENUS XXXVII.—MORCHELLA Dill.

Receptacle stipitate, pileate, clavate, globose, or conical, clothed above by the deeply folded or angular-pitted hymenium; substance between waxy and fleshy. Two to twelve inches high, growing on the ground, chiefly in spring, firm, not soon decaying; odour pleasant. There are six British species of *Morchella*, three of which are represented by models. Most are considered esculent.

Fig. 72.—Morchella esculenta L. (One-half natural size.)

175. **Morchella esculenta** L. Morel. — Pileus round, ovate, or oblong, and adnate at the base to the stalk; ribs firm, anastomosing, the intervals forming pits; the whole pileus when in good condition looks like a mass of honeycomb, yellowish or buff, but sometimes cinereous in colour; stalk even or broadly furrowed, generally yellowish-buff, but variable in hue.

It grows in hedgesides and bushy places in spring and early

summer; it prefers a limestone soil. Morels are often met with where ash and elm trees abound, and frequently on burnt ground, among dead twigs, etc. Odour faint, pleasant. Esculent, but deficient in flavour and tough. Sold in Swiss markets. In cooking morels fill the cavity with minced meat and stew slowly. Morels can be readily dried on strings in a dry room; they should, however, not touch each other, as contact favours the growth of mould. Morels are chiefly used for flavouring soups, sauces, and gravies. Ketchup can be made from them.

Sometimes the pileus of the growing fungus appears as if dusted with snuff. This is owing to the attack of a parasitic fungus, *Hypomyces cervinus* Tul.

176. **Morchella conica** Pers.—Pileus tapering-conical, adnate at the base to the stem; primary ribs longitudinal, secondary forming transverse folds; pits elongated, narrow, plicato-lacunose; stalk tapering upwards from the base, whitish.

Grows in woods and woody places. Edible.

177. **Morchella semilibera** DC.—Pileus conical, free half-way up; ribs longitudinal, forming oblong pits, which are veined within; stalk nearly even; colour lutescent, when dry dull fulvous; stalk whitish.

Fig. 73.—Gyromitra esculenta Pers. (One-half natural size.)

Grows in woods and woody places in spring and early summer. Edible.

GENUS XXXVIII. GYROMITRA Fr.

Receptacle stipitate, pileate, deflexed, bullato-inflated; ribs of hymenium gyrose. There are two British species; one of these is represented by a model.

178. **Gyromitra esculenta** Pers.—Pileus somewhat globose, inflated, irregularly undulate, gyroso-rugose, dark rich brown, margin annexed to the even, whitish-buff, villous stalk; substance fleshy.

A very rare species in Britain; it grows on sandy ground in the spring.

Said to be edible, but, according to the Rev. M. J. Berkeley, not always safe.

GENUS XXXIX.—HELVELLA L.

Receptacle stipitate, pileate, supported up the centre, deflexed,

sinuous; hymenium even. There are twelve British species, of which the two commonest are represented by models. Most of the species are reputed edible. Some grow in spring, others in autumn.

Fig. 74.—Helvella crispa Fr. (Natural size.)

179. **Helvella crispa** Fr.—Pileus deflexed, lobed, free, undulate and contorted, very pale brown; stalk fistulose, deeply ribbed and lacunose, white.

H. crispa is not uncommon in woods and by damp, grassy roadsides near hedges. Edible, but with little flavour and very tough; it is best for the table when slowly stewed in white sauce.

180. **Helvella elastica** Bull.—Pileus orbicular, sometimes twice or thrice lobed, free, even, inflated; stalk at first stuffed, then hollow, pruinose, thickened at base, sometimes slightly lacunose.

H. elastica grows in moist places in woods and on shady, bushy banks.

GENUS XL.—VERPA Sw.

Fig. 75.—Verpa digitaliformis Pers. (Natural size.)

Receptacle stipitate, regularly pileate, equally deflexed all round, conical; hymenium even or wrinkled. There are three British species of *Verpa*, one of which is represented by a model.

181. **Verpa conica** Sw.—Pileus slightly fleshy, campanulate, nearly even, brown; margin sub-sinuate, yellow beneath, as well as the slender, equal, round, hollow stalk.

V. conica grows on heaths and is very rare.

GENUS XLI.—LEOTIA Hill.

Receptacle stipitate, irregularly pileate, supported at the centre, orbicular, revolute at the margin; hymenium undulate or even. There are four British species, two of which are represented by models.

182. **Leotia lubrica** Pers. — Receptacle irregularly globular, yellow-olivaceous-green, slimy; stalk pulpy within, at length hollow, nearly equal, yellowish, clammy, with minute squamules.

Fig. 76.—Leotia lubrica Pers. (Natural size.)

L. lubrica grows in woods and in damp, bushy places; not uncommon; gregarious, somewhat cæspitose.

183. **Leotia acicularis** Pers.—Receptacle waxy, white, fragile, undulate and convex at maturity; stalk simple, slender, rarely branched, white, becoming crooked and discoloured.

On decayed stumps near the ground; gregarious or scattered.

GENUS XLII.—MITRULA Fr.

Receptacle stipitate, globular or oval, immarginate, even, concrete with the stalk. There are three British species, two of which are represented by models.

Fig. 77.—Mitrula paludosa Fr. (Natural size.)

184. **Mitrula cucullata** Fr. — Receptacle ovate, globose, or mitrate, even, yellowish-red or ferruginous, approaching black; stalk slender, solid, even, or tomentose downwards, flexuous, darker than receptacle or brown-black.

Grows gregariously on decaying pine leaves in the autumn.

Fig. 78.—Spathularia flavida Pers. (Natural size.)

185. **Mitrula paludosa** Fr.—Receptacle usually globose or ovate, bright yellow or orange; stalk slender, straight or flexuous, often enlarged upwards, white or tinted with ochre.

On decaying leaves and twigs, in marshes, pools, and wet places, in spring, summer, and autumn; generally gregarious or cæspitose.

GENUS XLIII.—SPATHULARIA Pers.

Receptacle stipitate, vertical, compressed laterally, decurrent

on opposite sides of stalk. There is but a single British species, which is represented by a model.

186. **Spathularia flavida** Pers.—Receptacle spathulate, compressed, undulate, nearly even, yellow; stalk white or faintly tinted with ochre.

S. flavida is not common; it grows on dead fir leaves and moss in damp woods; gregarious.

GENUS XLIV.—PEZIZA Dill.

Receptacle at first closed, afterwards expanding, cup-shaped, marginate; epidermis thin, contiguous, glabrous, pruinose or floccoso-furfuraceous, persistent, distinct; cups adfixed to the centre, often stipitate, unfolding, more or less concave, often becoming plane; hymenium smooth, nearly always differing in colour; substance fleshy-membranaceous, not waxy or gelatinous. There are more than a hundred British species of *Peziza*, of which nine are represented by models.

187. **Peziza macropus** Pers.—Cup stalked, hemispherical, then expanded, somewhat hairy; the whole plant externally ashy; disc mouse-coloured.

On the ground in shady woods. Summer and autumn.

188. **Peziza coccinea** Jacq.—Cup stalked, funnel-shaped; plant externally whitish and downy; disc bright blood-red or carmine.

A somewhat uncommon fungus, found in spring. It grows on fallen sticks in woods, especially dead branches of hazel. Sometimes it grows on sticks covered with earth, as if growing on the ground.

Easily recognised by its vivid colour. It rarely varies to wholly snow-white.

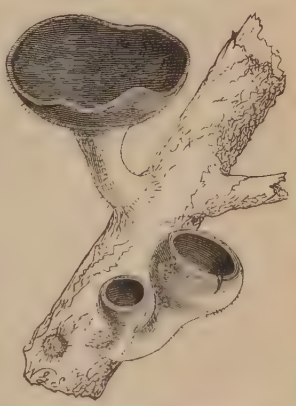


Fig. 79.—Peziza coccinea Jacq. (Natural size.)

189. **Peziza acetabulum** L.—Cup-shaped, furfuraceous, ribbed externally with branched veins, which run up from the short, lacunose, fistulose stalk; cup brown within, lighter brown without; stalk ribbed.

P. acetabulum is terrestrial, and generally grows in wet places in spring. Said to be edible.

Sometimes the cup of this fungus is dusted with brown powder, caused by the attack of a mould, *Hyponyces cervinus* Tul.

190. **Peziza leporina** Batsch.—Sub-stipitate, elongated on one side, and somewhat resembling in form the ear of a hare; externally

farinose; colour pale ochraceous, ochraceous-buff, or whitish-buff; base somewhat stalk-like, of the same colour.

Rare; it grows among dead leaves in woods and bushy places; gregarious, often cæspitose.

191. **Peziza aurantia** Œd.—Cup almost sessile, more or less irregular, contorted, oblique, and split; externally somewhat pruinose, and whitish, tinted with orange; odour when drying not unlike apricots, but earthy.

A terrestrial species, often cæspitose, met with in woods and gardens, common on paths, and among felled trees, branches, chips, twigs, etc.; known from other British species by its brilliant orange or scarlet-orange colour.

192. **Peziza cochleata** Bull.—Cup sessile, large, twisted, brown, externally pruinose.

Terrestrial, often densely cæspitose; frequent in summer and autumn.

193. **Peziza vesiculosa** Bull.—Cup large, entire, sessile, at first globose, margin somewhat crenate; pallid brown within, lighter without and furfuraceous; fragile, watery; the hymenium has a tendency to separate itself from the flesh of the cup at bottom.

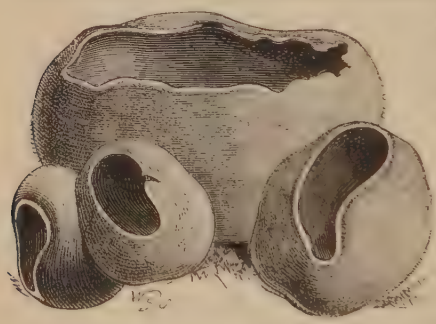


Fig. 80.—Peziza vesiculosa Bull. (Natural size.)

One of the most abundant British species; common on the ground in gardens, on manure heaps, on rotten leaves, tan, road-scrapings, etc.; spring to autumn, or even winter; generally cæspitose. When the fungus is gathered the spores are elastically projected into the air, and may be distinctly seen as a faint cloud.

194. **Peziza cerea** Sow.—Cup large, infundibuliform, repand, fleshy, very fragile; hymenium yellowish; externally furfuraceous, whitish, with a villous stem-like base.

P. cerea grows on the ground, among leaves, on tan, etc.; gregarious, cæspitose.

195. **Peziza melastoma** Sow.—Cup sub-stipitate; externally brick-red, downy-flocculose, bristly-hairy, sometimes naked; hymenium urceolate, black; stalk short, rooting by means of thick, black, strigose filaments.

Grows on rotten sticks, etc., in spring.

GENUS XLV.—HYMENOSCYPHA Fr.

Receptacle cup-shaped, opening freely, glabrous, with a slender stalk. There are fifty British species of *Hymenoscypha*; one is represented by a model.

196. **Hymenoscypha firma** Phil.—Cup infundibuliform, then expanded, repand, firm, smooth, dark or pale brown; stalk more or less elongated, becoming blackish-brown, attenuated downwards.

Common on rotten oak sticks; scattered or gregarious; leathery when fresh, hard when dry.

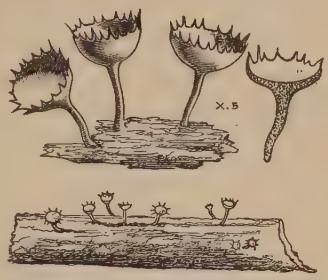


Fig. 81.—Hymenoscypha coronata Phil. (Natural size and enlarged five times.)

GENUS XLVI.—HELOTIUM Fr.

Receptacle sessile or shortly stalked, disc always open, plane or convex, waxy, naked. There are thirty-four British species of *Helotium*.

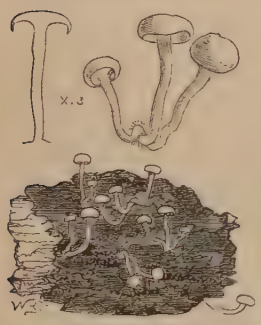


Fig. 82.—Helotium aciculare Fr. (Natural size and enlarged three times.)

197. **Helotium virgultorum** Fr.—Stipitate, tough, glabrous; hymenium yellowish-red, at length rufous; cup patellæform or frequently convex; exterior paler; stalk slender, attenuated downwards, sub-flocculose.

Common on twigs in damp, shady woods; gregarious.

198. **Helotium Calyculus** Sow.—Cup stipitate, concave, margin elevated or expanded, bright, clear, yellowish-brown, fleshy, firm, smooth; stalk thick, short, enlarging upwards into the cup.

Grows on decorticated wood and branches.

GENUS XLVII.—BULGARIA Fr.

Receptacle cup-shaped, substipitate or sessile, glabrous; cups at maturity plane or slightly convex; excipulus gelatinous. There are two British species of *Bulgaria*.

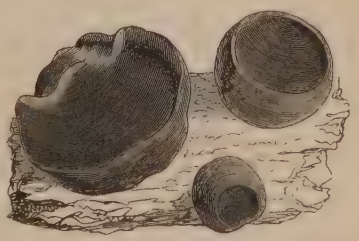


Fig. 83.—Bulgaria inquinans Fr. (Natural size.)

199. **Bulgaria inquinans** Fr.—Cæspitose, turbinate, firm, fleshy-gelatinous; externally wrinkled, rough, furfuraceous, umber; hymenium becoming plane, dark chocolate-brown, then black.

Common on fallen tree-trunks in autumn.

SUB-CLASS II.—PYRENOMYCETES.

In the *Pyrenomycetes* the asci are borne in flask-shaped bodies, *perithecia*, of carbonaceous or membranaceous consistency, sometimes confluent with the stroma, with an opening at the apex through which the spores escape.

GENUS XLVIII.—CORDYCEPS Fr.

Stroma erect, fleshy, clavate or capitate; perithecia immersed; spores linear, multi-septate, separating at the septa. There are seven British species, two of which are represented by models.

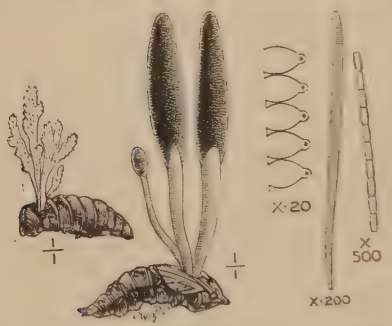


Fig. 84.—Cordyceps militaris Fr., with branching conidial state (Isaria farinosa Fr.). (Natural size.) Tubercles of stroma × 20. Ascus × 200. Portion of septate spore × 500.

200. **Cordyceps militaris** Fr.—At first sub-cæspitose, white, and mealy; then club-shaped and crimson, with the head minutely tuberculose and the stalk equal.

This plant grows upon the pupæ of moths in the ground.

201. **Cordyceps capitata** Fr.—Head ovato-globose, yellowish-brown, red-brown, or black; the stalk usually lemon-yellow, at length becoming blackish.

Far less common than the last; it is much larger, and grows parasitically on *Elaphomyces granulatus* Fr.

An allied species, *Cordyceps sinensis*, is sold in the markets of China as food. Caterpillars with the *Cordyceps* attached are tied with silk threads in small bundles; each bundle contains about eight or ten affected caterpillars, whose bodies are completely permeated by the mycelium of the fungus.

The best known of the larger species, *C. Robertsii*, grows on the larvæ of *Hepialus virescens* in New Zealand, and is popularly called the "vegetable caterpillar." When fully grown, this is six or eight inches high; it grows from the back of the second joint from the head of the victim, generally singly, but sometimes two from the same caterpillar.

An Australian species, still more remarkable, *C. Taylori*, grows on a large caterpillar, and attains a height of eight inches, being repeatedly branched like the antler of a deer; it is ashy-black in colour, and from three to six grow in a cluster.

GENUS XLIX.—HYPOCREA Fr.

Stroma variable; perithecia fleshy, pallid or coloured, ovato-globose and obtuse. There are nine British species of this genus.

202. **Hypocrea alutacea** Fr.—At first dull white, then tan-coloured; fleshy, soft, brittle; head slightly villous, then smooth, clavate, pallid, minutely tuberculate, confluent with the stem.

Frequent in fir woods, among leaves.

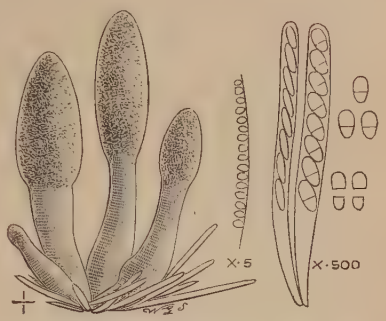


Fig. 85.—Hypocrea alutacea Fr. (Natural size.) Imbedded perithecia × 5. Asci and spores × 500.

GENUS L.—HYPOMYCES Tul.

Mycelium byssoid, colourless or coloured; perithecia small, globose, papillate. Parasitic on fungi. There are seven British species.

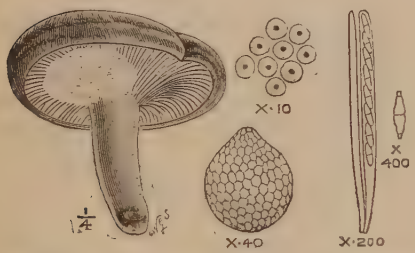


Fig. 86.—Hypomyces lateritius Tul. (One-quarter natural size.) Perithecia × 10, single perithecium × 40. Ascus and paraphyse × 200. Spore × 400.

203. **Hypomyces lateritius** Tul.—This is a microscopic parasite of brick-red colour and of frequent occurrence; it grows as a thick film over the gills of *Lactarius deliciosus*. In its earlier stages it is frosted over with a white powder.

GENUS LI.—XYLARIA Hill.

Stipitate; stroma corky, rarely fleshy; perithecia immersed. There are eight British species.

204. **Xylaria polymorpha** Grev.—Clubs turgid, corky, irregular, whitish-cinereous, then black.

A common fungus on old stumps, where it grows gregariously.

X. hypoxylon Grev., the "candle-snuff fungus," is a smaller and much more common species. Like *X. polymorpha*, it grows on and about stumps.

Fig. 87.—Xylaria polymorpha Grev., and section showing the perithecia. (Natural size.) Ascus × 400.

GENUS LII.—PORONIA Willd.

Stipitate; stroma between fleshy and corky, fructifying surface discoid; perithecia immersed. The following species is the only one known in Britain.

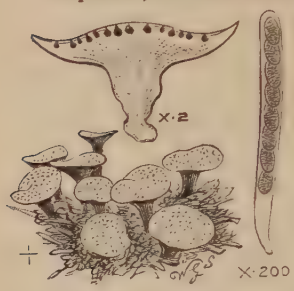


Fig. 88.—Poronia punctata Fr. (Natural size.) Section showing perithecia × 2. Ascus × 200.

205. **Poronia punctata** Fr.—Stipitate, turbinate, externally blackish; disc truncate, whitish, dotted with the black ostioles.

Gregarious on horse and cow dung.

GENUS LIII.—HYPOXYLON Bull.

Convex or plane; stroma corky or brittle; perithecia immersed. There are thirteen species in Britain.

206. **Hypoxylon coccineum** Bull.—Globose, about the size of a pea, often becoming confluent, at first pruinose, becoming brownish vermilion, black within; perithecia ovate with prominent ostiola.

Common on beech, and gregarious.

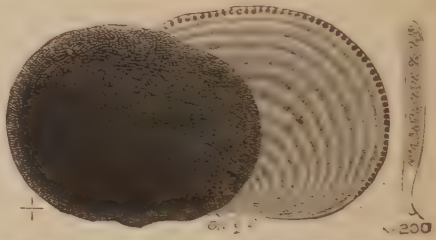


Fig. 89.—Hypoxylon concentricum Grev., and section showing the perithecia. (Natural size.) Ascus × 200.

SUB-CLASS III.—TUBERACEÆ.

Subterranean fungi; hymenium enclosed by an indehiscent peridium, waved and sinuate, often intricate and closely packed. There are thirteen genera and twenty-five species of British *Tuberaceæ*; two are illustrated by models.

GENUS LIV.—TUBER Mich.

Peridium warty or tuberculated, rarely smooth, without any definite base; spores elliptical, reticulate, or echinulate.

207. **Tuber æstivum** Vitt. The British Truffle.—Hard and black at maturity, polygonally warted outside and mottled with white and yellowish-brown inside.

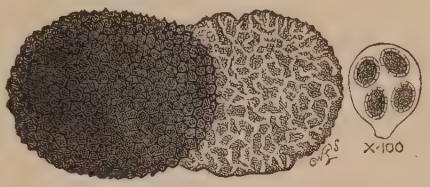


Fig. 90.—Tuber æstivum Vitt. and section. (Natural size.) Ascus × 100.

It is usually subterranean, but is seldom found more than three or four inches beneath the surface; it is sometimes half exposed. It is generally about the size of a walnut, but may attain a diameter of three or more inches. In rare cases single specimens weigh two, three, or four pounds. It is found in perfection from July to late autumn. It grows in copses, hedgerows, and open places in plantations gregariously with other species of *Tuber*, generally in plantations of beech, oak, or birch—rarely pine—on argillaceous or calcareous soil.

The odour of *T. æstivum* is potent and to some persons agreeable, and can sometimes be detected where truffles grow. Squirrels and pigs are fond of truffles, and scratch them up.

Edible, but hard and indigestible.

The truffle of France, used in *pâté de foie gras* and *poulard truffé*, is *Tuber melanosporum* Vitt. The truffle used in Italy is *T. magnatum*, which is garlic-scented. These species have not been recorded as British.

GENUS LV.—CHOIROMYCES Vitt.

Integument even; base definite; sporidia spherical.

208. **Choiromyces meandriformis** Vitt. White Truffle.—Exterior is marked with depressions, somewhat like the eyes of a potato. The whole plant indeed resembles externally an ordinary pale-skinned potato, both in general colour and size. The interior is marbled with brown and white veins; it becomes yellow in drying. When young scentless, but when mature the odour is very strong, like decaying cheese.

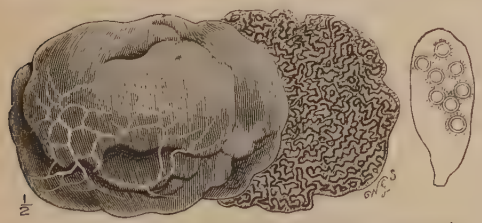


Fig. 91.—Choiromyces meandriformis Vitt. and section. (One-half natural size.) Ascus × 100.

This is a large species, and generally grows in open, hilly places, half buried in stiff soil; it prefers oak plantations, and may be found in summer and autumn. When young this truffle is white; at length it becomes pale buff or brownish.

Esteemed, but has been known to produce unpleasant effects when eaten in a raw state.

CLASS III.—MYXOMYCETES.

The *Myxomycetes*, or "slime-fungi," of which there are a large number of British genera and species, are represented by models of two species only. Although usually placed among fungi, the *Myxomycetes* show great affinities with the animal kingdom. There is in the *Myxomycetes* no cellular mycelium as in the true fungi.

GENUS LVI.—FULIGO Hall.

The fruit irregular, formed of intertwined, elongate sporangia, containing an irregular network of threads and the spores. The outer sporangia form a friable, spurious cortex, containing much lime. The following is the only British species.

209. **Fuligo varians** Somm. Popularly known as "flowers of tan."—An irregular yellow mass, very variable in size; it becomes at length a dusty mass of violet-black spores. Under favourable conditions the spores will retain their vitality for several years.

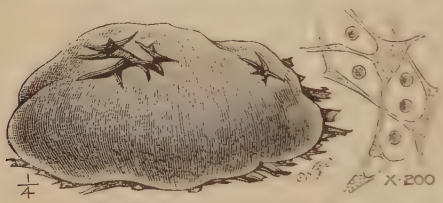


Fig. 92.—Fuligo varians Somm. (Natural size.) Spores and threads × 200.

Frequent on tan-beds, sawdust, and sometimes on stumps. It is often a great nuisance in hot-houses where tan is used, for the *Fuligo* will sometimes completely cover the tan and entirely stop the growth of plants which are being cultivated.

It has been found to contain formic and acetic acids.

GENUS LVII.—LYCOGALA Mich.

The fruit regular, enclosed in a definite cortex, and formed of sporangia containing round spores and branching and anastomosing threads, with external thickenings in the shape of irregular rings. There are two British species.

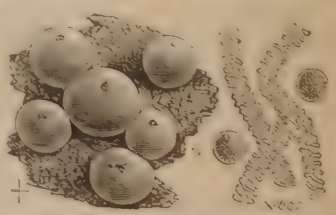


Fig. 93.—Lycogala epidendrum Fr. (Natural size.) Spores and threads × 600.

210. **Lycogala epidendrum** Fr.—Soft, pulpy, and warted, usually the size of a large pea, and bright pink or rose-coloured, varying to greyish clay-colour, purple, and blood-red; pulp within often scarlet, at length becoming a dusty mass of spores, which varies in colour like the exterior of the fungus.

Not an uncommon fungus upon dead stumps and branches.

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